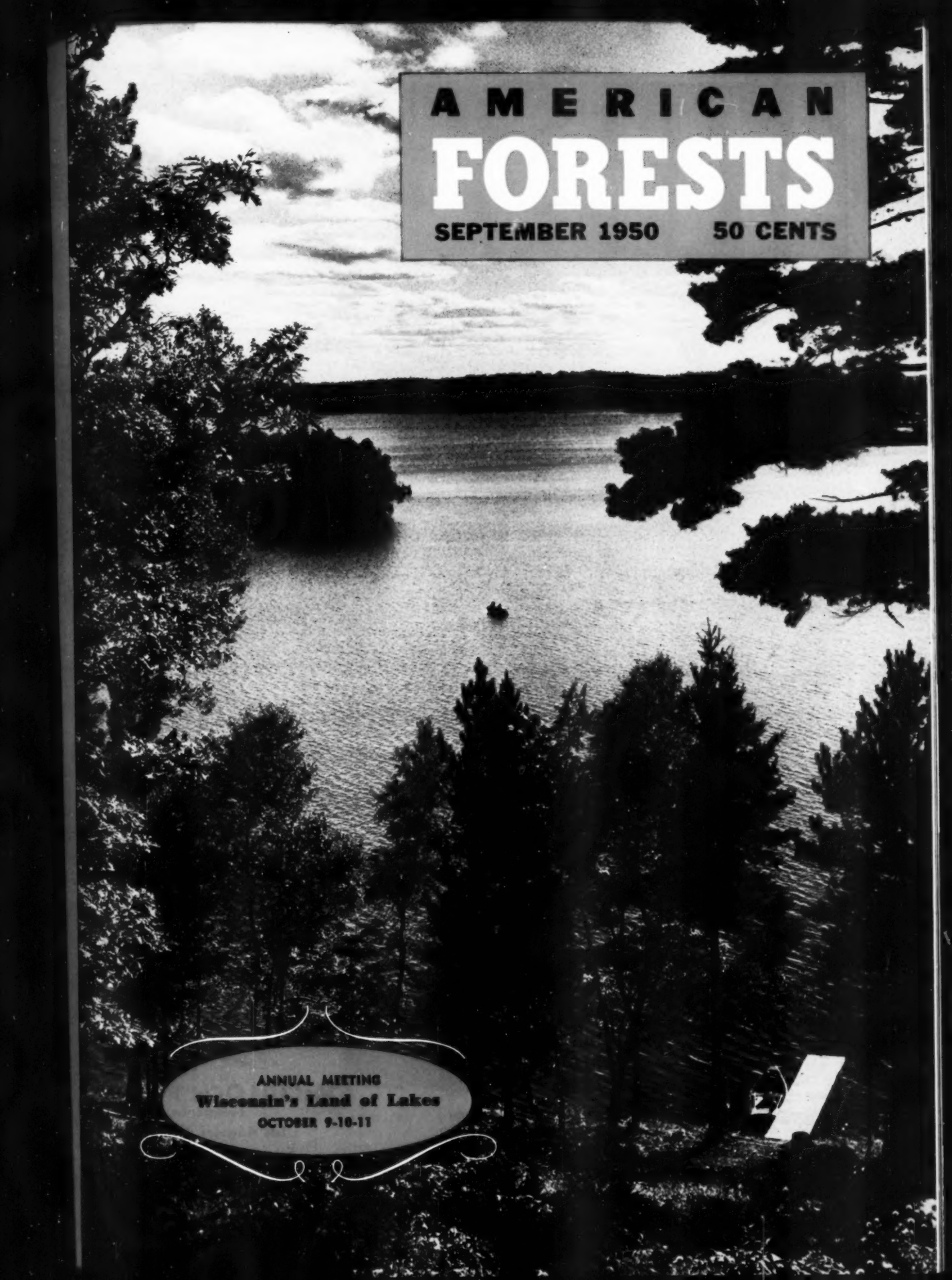
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ANNUAL MEETING
Wisconsin's Land of Lakes
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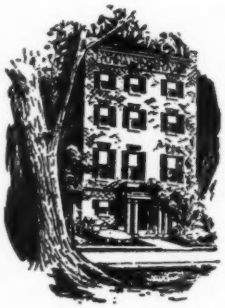
NATIONWIDE SALES AND SERVICE

SEPTEMBER, 1950
VOLUME 56
NUMBER 9

American FORESTS

PUBLISHED BY THE AMERICAN FORESTRY ASSOCIATION



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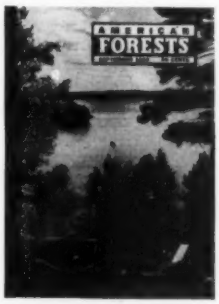
The AFA

The American Forestry Association, publishers of *American Forests*, is a national organization—independent and non-political in character—for the advancement of intelligent management and use of forests and related resources of soil, water, wildlife and outdoor recreation. Its purpose is to create an enlightened public appreciation of these resources and the part they play in the social and economic life of the nation. Created in 1875, it is the oldest national forest conservation organization in America.

75th ANNIVERSARY 1875 1950
THE AMERICAN FORESTRY ASSOCIATION

Cover . . . . . .



The northern portion of Wisconsin, part of America's North Woods Country, is dotted with charming lakes and streams—attractive not only to the fisherman and canoeist but to the nature lover as well. Typical of the magnificent scenery so abundant in the Badger State is this serene photo taken by the Wisconsin Conservation Department. It pictures tree-lined High Lake in Vilas County not far from Eagle River—headquarters for The American Forestry Association's Anniversary Meeting in October.

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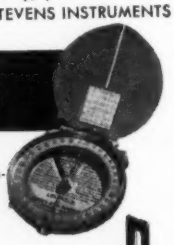

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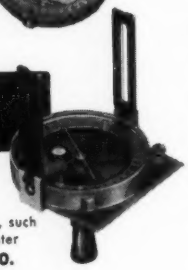

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LETTERS TO THE EDITOR

Advice on the Use of Penta

I have read O. A. Fitzgerald's article, "How to Make Fence Posts Last Longer," with much interest.

The author is entitled to his enthusiasm, for laboratory and service tests have shown "penta" to be promising for farm use as a post preservative. However, I wish he had tempered some of his statements with factual data. It is true that penta (and a score of other chemicals) will control decay *if* one can get it deep enough into the wood to give economical service life. Shallow penetration does not provide long service life.

It is true that cold-soak treatments applied with simple, economical equipment such as that mentioned by the author may be recommended for lodgepole, eastern white, Norway and southern yellow pines and a few other coniferous species. Even a few species of hardwoods may be recommended for treatment by cold-soaking. In Idaho only three are so classified; five other species are classified as "satisfactory" if special conditions and methods are used. The article infers that penta is a panacea for the farmer's post decay troubles, and this is not substantiated by facts. The chemical has given highly satisfactory results where it penetrated the wood to a satisfactory depth. Wohletz and Ravenscroft in their bulletin caution their readers by classifying local species as to treatability or "the ease with which they take treatment."

The article does not mention that only round, dry posts should be treated, and seasoning is one of the most important steps in preparing posts for cold-soaking treatment. The author advises that "All a farmer does is peel the sticks and soak them in a drum of the penta solution." Wohletz and Ravenscroft used almost two pages of their bulletin to describe seasoning details.

The estimate credited to the Forest Service concerning the number of posts treated in 1947 (12 million) applies only to commercially treated posts. The estimated 750,000 posts Idaho farmers treated in 1947, and those treated by small operators and farmers in other states, should be added to the estimate. On the basis of a survey made in 1947, the estimated total was about 26 million.

Wood preservation as a means of conserving our timber resource needs all the advertising and plugs that journalists can give it, but the advertising and promotional propaganda must be scientifically sound. The layman who is stimulated to action by Mr. Fitzgerald's article won't blame his treating technique should he secure improper penetration and early failure of his posts. He will blame penta.

C. S. Walters
Forest Utilization Research
University of Illinois

Urbana, Illinois

U. S. Concern

It has been our pleasure to read the editorial "When Legislators Get Careless" concerning H.R. 4424 in the July issue of *American Forests.*

It seems to us that you have made a very accurate appraisal of the possible effects of this bill on the national forests if it becomes a law. As you know, the Forest Service, through its management of national forests in Alaska, is very much concerned with what could happen to the entire national forest system if an opening for breaking up the Alaskan national forests were made through this bill.

C. M. Granger
U. S. Forest Service

Washington, D. C.

Should Hawaii Have Deer?

I wish to draw your attention to the ghastly decision of our local Board of Agriculture and Forestry to introduce the axis deer to the Island of Hawaii.

About 98 percent of the native Hawaiian flora is endemic and many of these plants belong actually to endemic genera. It has taken millions of years to produce or evolve them. The introduction of deer to Hawaii, where there is no natural enemy, will be like a plague. The animals will reproduce until prevented from doing so any further because of starvation, and starvation *follows* the extermination of our remarkable native vegetation. Many of the members of the local board are businessmen or lawyers, quite ignorant about conservation or biological matters. They might listen to the advice of mainland experts so I am taking the liberty of asking these experts to write their opinions regarding the introduction of deer to such men as: His Excellency, Governor Stainback; Editor, the *Star-Bulletin;* Editor, the *Advertiser;* Colin Lennox, Board of Agriculture and Forestry, all of Honolulu, T. H.

Otto Degener

Mokuleia Beach
Waialua, Oahu, T. H.

Beauty Has a Dollar Value, Too

Can anyone justify the annual burning over of non-commercial woodlands?

Our community, as well as numerous others in hilly Westchester County, New York, has an appreciable amount of undeveloped land that is naturally beautiful. The county has a reputation as a desirable place to live because of its beauty. Yet I've noticed that numbers of our dogwoods have been girdled by fire and destroyed. There are even oaks that have been scorched so frequently they are rotting. Many blooming shrubs and wildflowers are gone from such burn-blighted areas. Soil has eroded from the steeper spots.

The proponents of burning over the land, which they do not even own, say it "cleans it up," removes undesirable scrub, "sweetens" the soil, and helps the grass to grow. What it adds up to is that they don't care for the native flora.

Fortunately a few here and there raise their voices against it. It would be desirable for more suburbanites to become conservation conscious in their own neighborhoods. Beauty has a dollar value, too.

Franklin Daniel Frantz

Hastings-on-Hudson, New York

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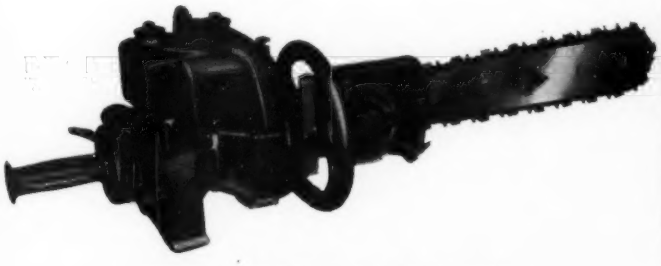

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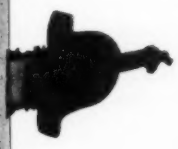

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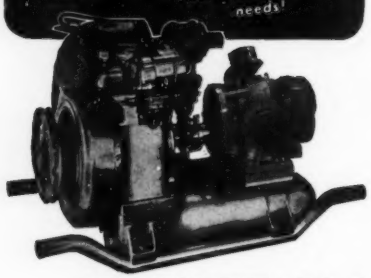

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ERLE KAUFFMAN RESIGNS AS EDITOR

This issue of *American Forests* is the last which will carry the name: Erle Kauffman, Editor. After twenty-three years of loyal service to the magazine, to The American Forestry Association which publishes it, and to the forestry and conservation field it encompasses, Erle is resigning, effective September 1, to return to the field of professional writing.

Editor of *American Forests* since 1944 and associate editor since 1936, Erle came to the magazine in March, 1927 as an assistant editor. Since that time he has written more than fifty signed feature articles, along with an uncounted number of editorials and other unsigned material. Among those readers still remember vividly are "Conservation Over the Dam," "Roots," "Death in Blackwater Canyon" and "Timber Homestead in Alaska."

He has also written two books: *Trees of Washington, the Man and the City* (1932), and *Kingdom of the Trees* (1940), plus numerous articles for other national magazines.

In addition to his prolific activities with typewriter and editorial pencil, Erle also found time to perform a myriad of other services for the AFA. He conceived and launched the Association's Trail Riders of the Wilderness horseback expeditions into little traveled areas of the nation's national forests. These trips, begun in 1933, have proved popular with thousands of Association members.

He has also handled much of the Association's publicity and educational program. He has helped make many of the Association's annual meetings run smoothly, and he has been responsible for publicizing many of the Association's special projects far beyond the realm of its own members.

In the Association's pioneering Southern Educational Project in the early thirties, aimed particularly at forest fire prevention, Erle took an even more active role by writing and directing two full length motion pictures, *Pardners* and *Burnin' Bill*. Their use throughout the South did much to stimulate an awareness of a serious problem.

ERLE KAUFFMAN

Though the Kauffman name will no longer grace the editorial masthead, *American Forests* readers can look forward to at least two more feature articles bearing his signature. One scheduled for early publication will tell the story of California's redwood industry. Another will be a Southern story. Perhaps there will be others, for Erle has offered us his help. We wish him success in his new ventures—and our thanks for a job well done.

S. L. F.

1951 COMMITTEE ON ELECTIONS ANNOUNCED

The Committee on Elections to nominate candidates for officers and directors of The American Forestry Association for 1951 includes Dr. George A. Garratt, Dean, School of Forestry, Yale University, New Haven 11, Connecticut, chairman; A. Z. Nelson, Consulting Forester, New Ipswich, New Hampshire, and Clint Davis, U. S. Forest Service, Washington, D. C.

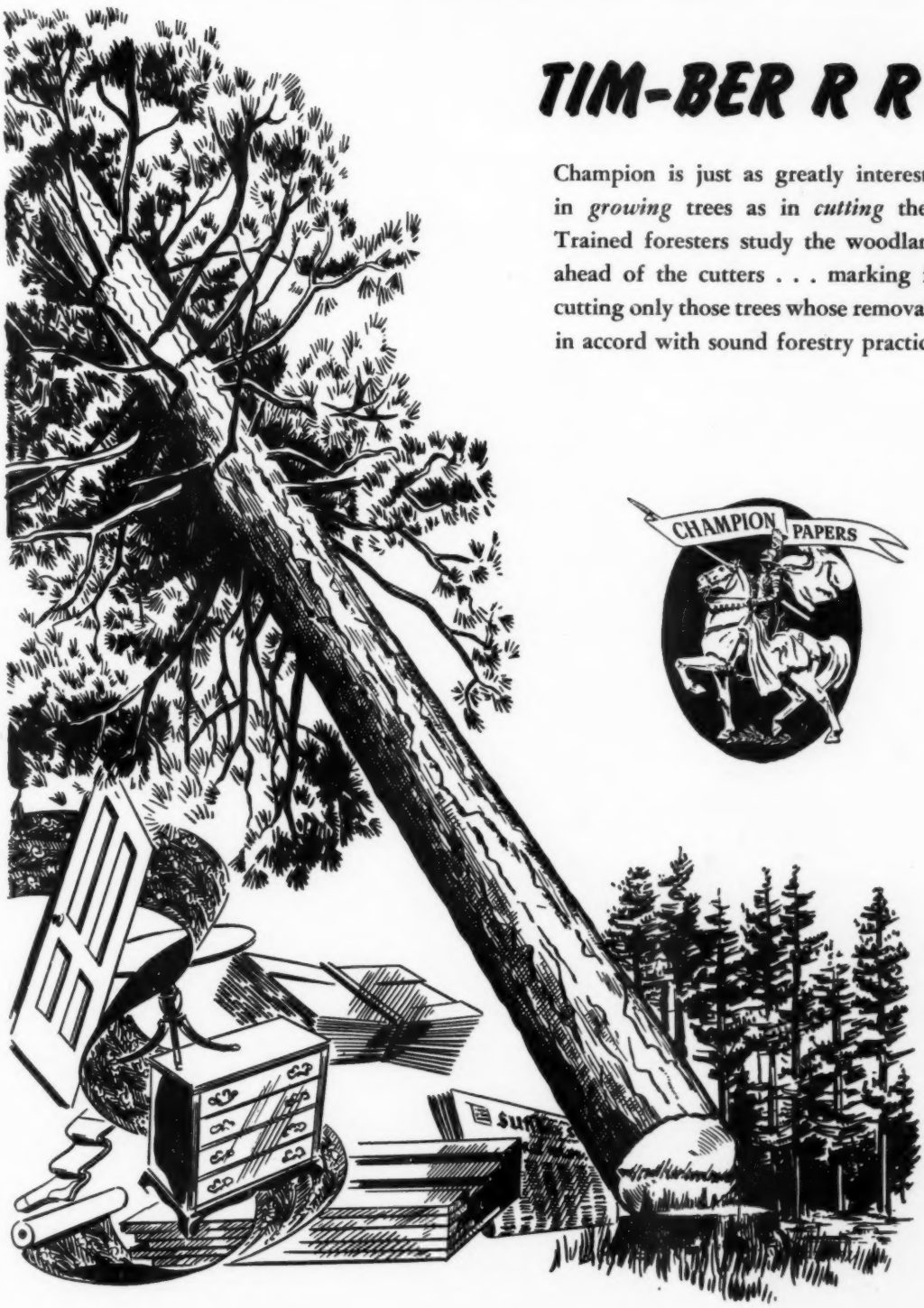
The next election by letter ballot will take place December 1, 1950. Officers to be elected are a president and a treasurer, each for one year, five directors for terms of three years each and twenty-one honorary vice-presidents for one-year terms. Directors whose terms expire are: Bryce C. Browning, New Philadelphia, Ohio; Samuel T. Dana, Ann Arbor, Michigan; Charles H. Flory, Columbia, South Carolina; George W. Merck, West Orange, New Jersey, and William P. Wharton of Groton, Massachusetts.

The Committee on Elections wel-

(*Turn to page* 42)

TIM-BER R R !

Champion is just as greatly interested in *growing* trees as in *cutting* them. Trained foresters study the woodlands ahead of the cutters . . . marking for cutting only those trees whose removal is in accord with sound forestry practices.



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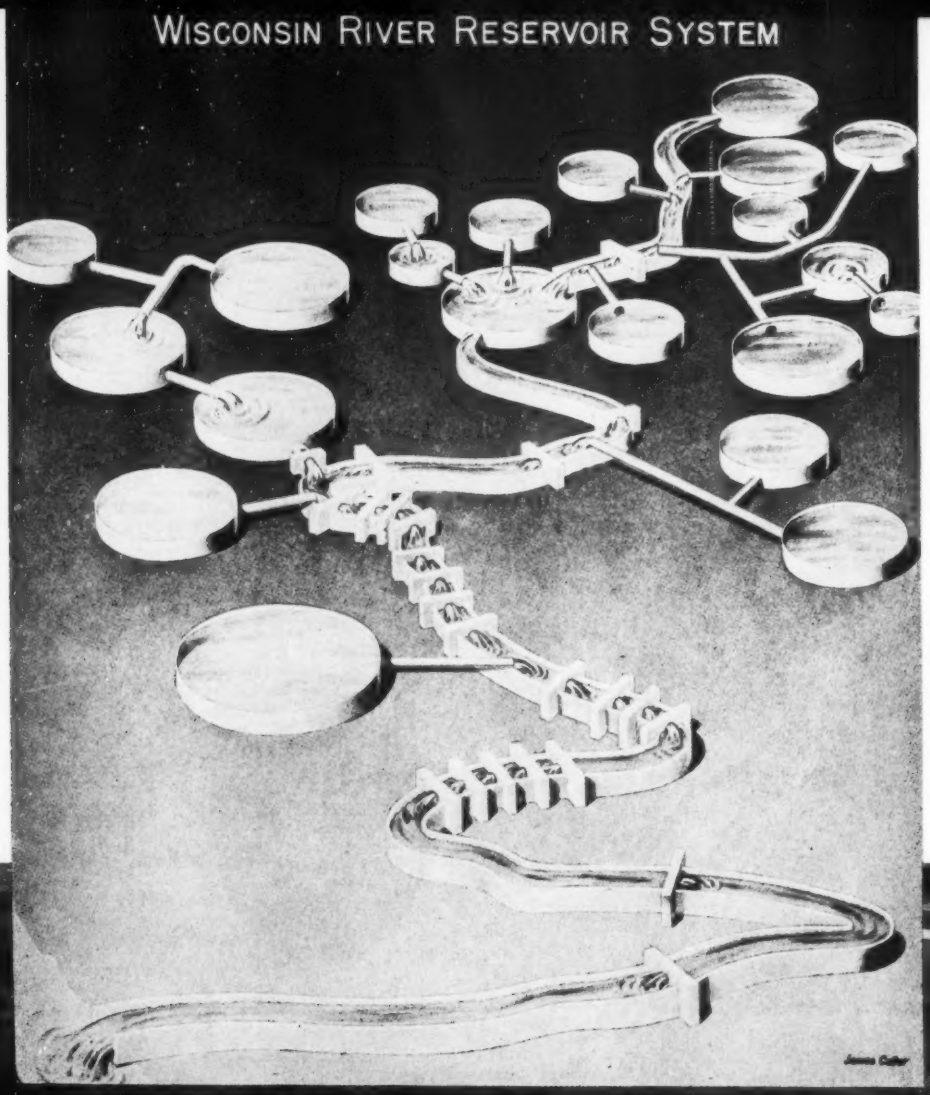
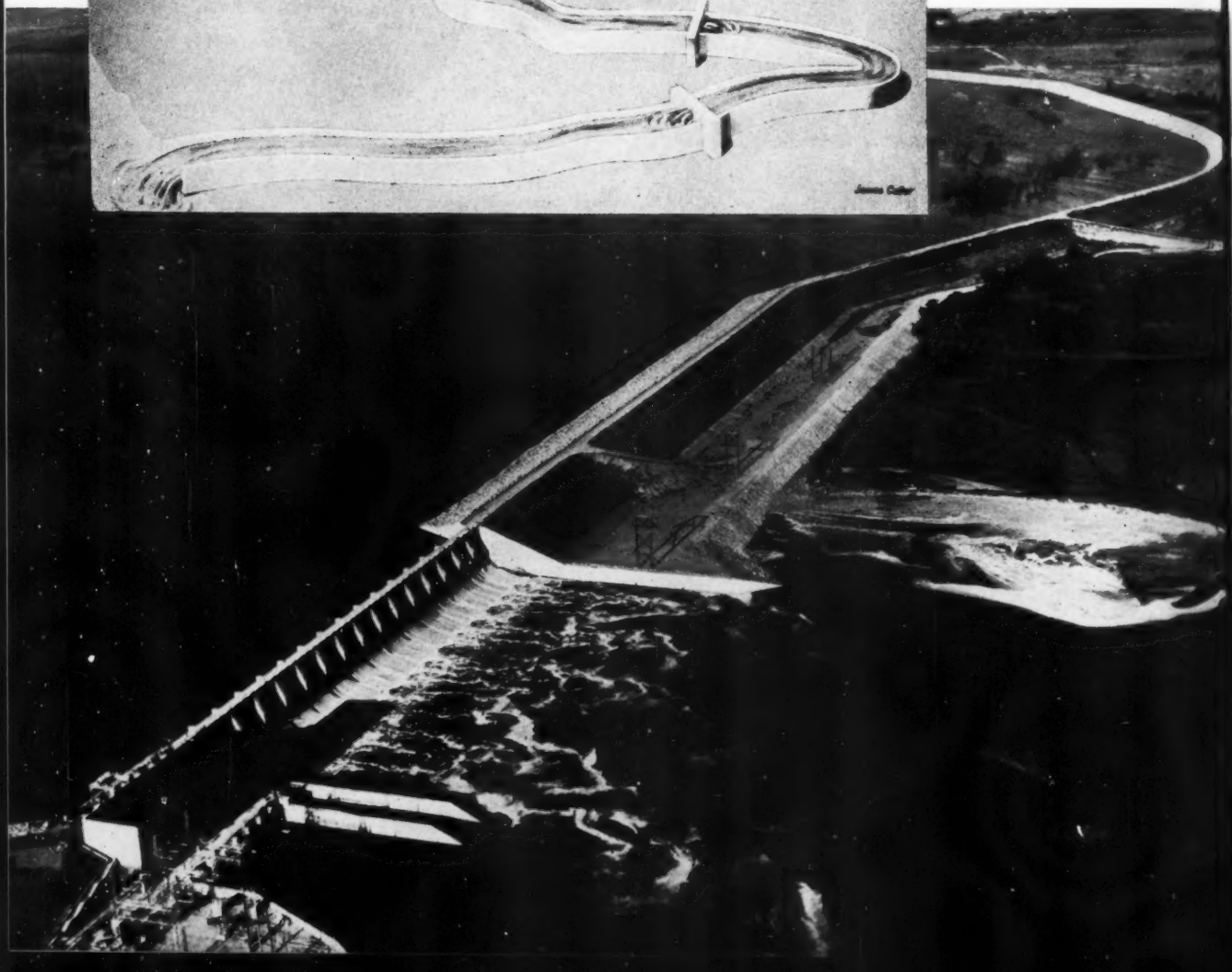


At left, the reservoir and dam system of the Wisconsin Valley Improvement Company. Below, Petenwell Dam near Necedah, one of twenty-six operated by WVIC members



Wisconsin's Answer to a River Problem

Few rivers now work harder or more effectively than the Wisconsin, thanks to WVIC, a unique cooperative of industrial water and power users who scorn federal funds in bringing better water, flood control and prosperity to the Wisconsin Valley

By LEONARD ENGEL

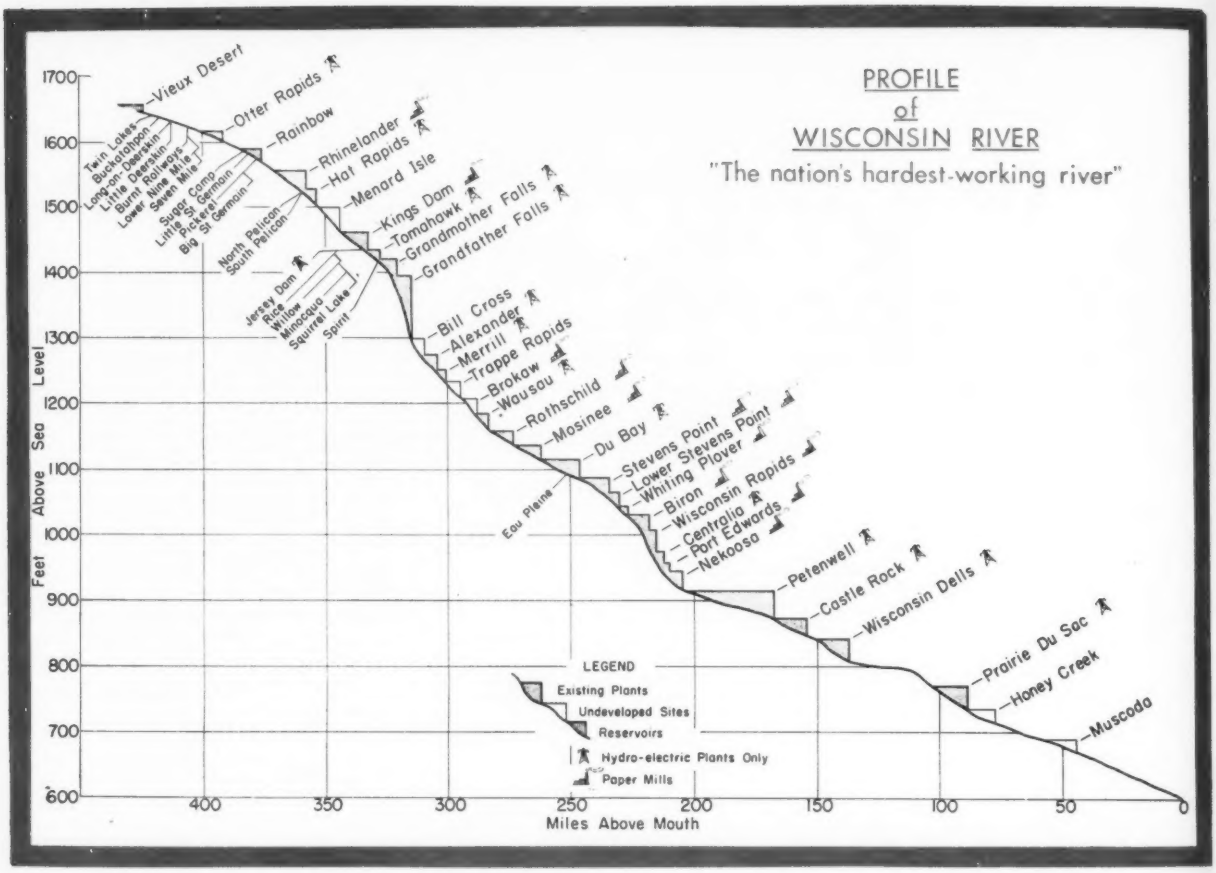
A SHORT distance downstream from the town of Nekoosa, home of a widely known brand of stationery papers, there are two new dams across the Wisconsin River. The generators in the neat brick powerhouse atop Petenwell Dam, completed last year, draw 20,000 kilowatts of power from the river; Castle Rock, finished just this June, draws 15,000. To a nation accustomed to projects like Grand Coulee, dams of such modest proportions ordinarily aren't news. These two, however, are the latest additions to a remarkable undertaking—a "TVA" set up entirely by private enterprise.

For four decades, the prosperous industrial towns and dairy farms of the Wisconsin valley have enjoyed the benefits of flood control, water conservation and systematic development of hydroelectricity without the expenditure of a cent of government funds. This seeming miracle has come about through a unique cooperative of private water power users, the Wisconsin Valley Improvement Company.

The "improvement company," as it is known up and down the valley, operates a system of twenty-two interconnected reservoirs through which the flow of the river is controlled with nearly the precision of a railroad dispatcher sending out trains. Floods have been checked with singular success; only once since 1912 has the Wisconsin, which cuts through the Badger State from northeast to southwest on its way to the Mississippi, got out of hand. In dry periods, enough water has been kept in the stream to maintain both the fishing and the scenery, though the Wisconsin must dispose of large tonnages of sewage and paper mill and cheese factory wastes. And a smooth flow of water has been provided for generating power at twenty-six dams operated by WVIC members. Thanks to the WVIC, which is financed entirely by tolls on the water used by members and pays full taxes, there are few rivers that work harder or more effectively than the Wisconsin.

The activities of the improvement company on the river are complemented by a similar privately-sponsored reforestation program along the river. The WVIC's members have not only planted tens of millions of trees on their own lands, but have set up a sister agency, Trees for Tomorrow, Inc., to promote reforestation and scientific tree cropping throughout the valley, both as a measure of watershed protection and in order to restore the valley's once-great forests.

Of course, the Wisconsin isn't as big or showy as the federal power-flood control-navigation-reforestation undertaking on the Tennessee. The 430-mile-long Wisconsin—the "River of a Thousand Isles" to the seventeenth and eighteenth century French trappers who traveled it between the Great Lakes and the Mississippi—is 200 miles shorter than the Tennessee and has but a fifth the volume. Its drainage area covers only 12,280 square miles; the Tennessee basin extends into seven states. What is being done in the Wisconsin valley is nonetheless useful as a demonstration of another



pattern of effective resource management.

Over the next several years, the federal government is slated to spend almost a billion dollars a year on river development. Even more will be laid out if Congress should set up TVA-type multi-purpose authorities on the Columbia and Missouri, and order a start on the St. Lawrence Seaway. Many of the government projects are super-sized developments on our greatest rivers, such as McNary Dam on the Columbia, which will cost $594,000,000. Assuming their desirability, such projects are likely to remain in the domain of government, for private enterprise can hardly raise the huge sums needed for undertakings of such size.

However, government agencies, which have a virtual monopoly on dam building and related activities under present federal law, have also blue-printed scores of smaller projects on lesser rivers. Many of these have even won preliminary approval from Congress, but it will be at least two decades before the great majority are actually started. We might obtain equally effective and much speedier development of our smaller valleys—which are as prone as the larger to flood and which form a significant part of our water and land resources—by proceeding along the line followed in the Wisconsin valley. As an extra of consequence this would also cut federal outlays and bring in tax revenue.

The Wisconsin Valley Improvement Company, to which every valley company that uses water power to generate electricity or turn water wheels must belong, has eleven stockholders. Two are public utilities: the Wisconsin Public Service Corporation, serving northeastern Wisconsin, and Wisconsin Power and Light, whose lines reach into 320 towns and rural communities in the southern part of the state. The other WVIC companies are all papermakers and include some of the best known industrial names in the United States. Nekoosa-Edwards, stationery paper manufacturer with dams and plants in three river towns, is one. Another is Consolidated Water Power and Paper, magazine paper and plastic pioneer, and, with two utilities, the builders of Petenwell and Castle Rock dams. Still others are National Container, the container firm; Rhinelander Paper, one of the world's largest producers of glassine and waxed papers; and Marathon, leader in frozen-food packaging and by-product chemicals from wood waste.

Wisconsin's private TVA was born in the decline of the once great Wisconsin lumber industry. Shortly after the turn of the century, a half dozen of the venturesome men who had made fortunes in pine recognized that the days of lumbering were numbered; most of the trees big enough for sawlogs were gone. Their interest turned to paper, which was already being made in several valley towns from smaller trees, still plentiful.

With the river for power, papermaking could keep the Wisconsin forest industries going for decades. G. D. Jones, a lawyer with extensive local landholdings, and Neal Brown, a writer, pointed out that more power, paper and money could be made if the riverflow were ironed out by

a chain of reservoirs, the first links of which were already at hand in the "flooding reservoirs" used by lumbermen to store water for the spring log drives. The flooding reservoirs had but to be combined under a single management. Jones and Brown not only sold the lumbermen-papermen on joining forces to set the reservoir system up, but obtained the necessary charter from a hostile state legislature, which was prone (this was during the governorship of "Fighting Bob" La Follette) to view such proposals as "power company plots."

When the valley company set up shop, there were nine controlled-lake reservoirs and fourteen power dams, all small, on feeder streams and on the main river. The reservoir dams, harking back to the role of the reservoirs in the annual log drive, were temporary log cribs, meant to be breached each spring. Half of the power dams were old-fashioned hydromechanical units.

The WVIC now has five big artificial reservoirs and sixteen of the controlled-lake type, all with permanent dams. Acquisition of land has also begun for an ambitious new project, a reservoir which will be second in size only to Lake Winnebago, the state's largest body of water. The reservoir, to be named for WVIC President George W. Mead, one of the moving spirits behind the valley company, will raise the WVIC's storage capacity to double the present level and seven times the capacity when the reservoir system was launched.

A WVIC member planted 50,000 trees on valley's watershed this spring

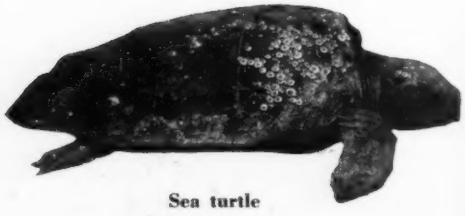
Power production has grown equally rapidly. With a larger supply of dependable reservoir water, WVIC members have rebuilt and enlarged most of the old dams and added ten new ones. Down at Prairie du Sac, Wisconsin Power and Light has put in the largest hydro plant in the state, with a capacity of 29,500 kilowatts. At Grandfather Falls—a series of rapids rather than a fall, despite the name—Wisconsin Public Service replaced the old low-head

(*Turn to page* 38)

Engineers call this Grandfather Falls plant one of the most efficient hydro units in the U. S.

U. S. Fish & Wildlife Service Photo

So well have deer thrived under protection that limited hunting with bow and arrow is permitted on Blackbeard



Sea turtle

Ward's heron

← American egret

PIRATE ISLE

By CHARLES ELLIOTT

THE tide was almost out. I could feel its ebbing surge against my knees, could hear the pounding of its tremendous heartbeat as it boomed along the beach, scrubbing the flange of sand to a shining white. Beyond me lay the broad Atlantic, its bosom swelling to the timeless symphony of the sea. I braced my feet against the tugging, clean sea water and with all the backbone in the greenheart rod, heaved my rig over the breaking waves. Big bass were feeding in the flats beyond the beach, where oceanic tides boiled and ripped and churned together.

Not a track marred the polished beach floor behind me. Except for a wheeling, mewing circle of terns off shore, and a speck of bird that floated almost beyond vision in the blue, I stood as desolate as I might have been on a lost atoll in the far Pacific. But this wasn't an atoll. It was one of Georgia's golden isles, lonely now, but rich in lore and colorful tradition.

Behind the emerald wall that flanked the beach lay Blackbeard Island, built on earth a buccaneer had drenched in blood, on hallowed ground where Franciscan monks had knelt to pray. This had been the home of Edward Teach, whose plaited long black beard had given him his name. More than two and a quarter centuries ago, the notorious English pirate had made the isle his base while he plundered ships that sailed the Spanish Main. He buried his gold and precious trinkets there. He once said that no one but he and the devil

Atlanta Journal Photo

A procession of white ibises searches for fish and other edibles in shallow slough on the pirate isle

knew where the treasure cache was hidden, and "the longest liver should take all." When he was attacked and shot down by two British warships just before Thanksgiving in 1718, the secret of his iron bound chests died with him.

As I walked along the lonely beach to my fishing spot, I had half expected the old pirate himself to swagger out of the woods, angrily toss his braided locks at my intrusion and run me through with his sword. But the island retained its ghosts and its secrets and prosaically left me on the isolated strand.

The only organized hunt ever made on Blackbeard was in 1934, when permission was granted explorers to comb the woods and beaches for booty. There is no account that any part of the fabulous loot was ever discovered.

Blackbeard, and all but two of the outer islands of Georgia, have lived under five flags in the past 400 years. In 1562, Jean Ribault sailed along the coast, gave French names to the rivers and other geographic features, and tentatively claimed this land for France. On his heels, four years later, Pedro Menendez de Aviles established missions and outposts for his Spanish king. He named the entire Georgia coast Quale (pronounced Wallie) for an Indian chief who had befriended him. Mission life along this raw frontier was rough, even for the Franciscan monks, and after approximately a hundred years, Spain had virtually abandoned the islands. At the Battle of Bloody Marsh in 1742, General Oglethorpe drove the remnants of the Spaniards into Florida.

Blackbeard Island was made into a migratory game refuge by executive order of the President on July 17, 1914. Until the time the guardians of the nation's wildlife moved in and began to groom it for its winter job of caring for the southward flight of ducks and geese and other migrant flyers, it had been a desolate spit of land, hung on the bosom of the broad Atlantic, visited only by itinerant hunters and a few fishermen who waded the outer rim of the spit for the big sea bass. Much of the game was killed by jack-lighting at night, and in the spring, boats probed the sandy beach, looking for tracks of the enormous sea turtles that came ashore to leave their fertile embryos in the warm sand.

I remember one warm night when we went to watch for these sea monsters to come out of the deep. The moon swung like an incandescent globe over the sea, its white translucence illuminating the beach and wooded island behind us with chalky light. Beyond the beach the green sea moved with long, slow swells like the measureless rhythm of time. Then they broke and washed against the sand with a lazy swoosh that made them a part of the earth again.

The marsh and festooned oak clumps on the island were like a sprawling wilderness city, peopled with herons and frogs, with raccoons and owls and myriads of other creatures who had come alive at dusk and were now blending their voices in a strident chorus. We sat as quietly as if we had been two earthlings with a grandstand seat in the Mesozoic, our ears alert, our eyes straining at the dark waters of the ocean.

For more than six hours we crouched on this point of land, waiting for the ocean to disgorge one of the armor plated giants. Most of the night was gone and my eyes were heavy. Only the prehistoric weirdness kept me awake. Suddenly Mac,

Fifteen miles off the Georgia mainland lies Blackbeard Island, an emerald paradise for wildlife. But there was a day when the notorious pirate Edward Teach—the feared "Blackbeard" of the Spanish Main—used it as a base, some say to bury his iron bound chests of plundered treasure

who had dozed beside me, clutched my arm.

"Look! Toward the inlet!"

Out of the darkened seas lumbered a shell-clad mammoth. As slow and deliberate as crawling infinity itself, the giant turtle dragged across the wet beach sand to a dune above the wash of the tides. With an almost imperceptible motion, she scraped out a hollow depression and shifting around for a few moments, began to deposit her eggs. I was as fascinated as if I had been peeping in on one of earth's secrets at the beginning of time. The moon was sinking toward the horizon when she covered her nest with sand, waddled across the strand into the tide and disappeared.

That morning we dug into the nest and counted 142 eggs in the sand. The nest was small. The loggerhead we saw might have weighed 150 to 200 pounds. We couldn't tell by moonlight. There are huge sea turtles capable of laying up to 1000 eggs, though such occurrences are rare. We returned the eggs to the warm sand, erased all tracks to hide them from the prying eyes of the wild and from turtle egg hunters who flaunt the law to gather the soft shell delicacies. Along this beach each spring, a prodigious number of eggs are laid by turtles weighing up to a quarter of a ton.

In the first two decades after the island was converted into a government wildlife refuge, the protection was more beneficial to the deer than to any other species. Freed from the ravages of the night hunters, the deer multiplied and overran the island. In the late thirties it became apparent that some of the deer would have to

The high land on Blackbeard is covered with live oak, palmetto and a few pines (above). And for migratory waterfowl there are fifteen hundred acres of fresh water ponds shown in background of photograph at right

be removed before disease or starvation wiped them out. An agreement was drawn up between the state and federal government for the removal of the surplus animals, and a trapper by the name of Tom Hardy was sent to the island to do the job.

Regulation deer traps, opened at the ends and with a trigger to spring both doors when the deer walked inside for apples or other "bait," were constructed on the island and placed along the trails in strategic spots. Boat and truck facilities were established to move trapped deer to areas in Georgia where no white-tails had been seen in half a century. Half a dozen game clubs, which had set up large refuges and agreed to pay the cost of trapping and transportation,

waited impatiently for the first shipment of the animals.

That fall, nature overdid herself in providing a bountiful food supply, loading her oak trees with acorns and holding her tender shrub and tree leaves until long after Thanksgiving. With natural food so plentiful, no kind or amount of bait could lure the animals into the smelly man-made traps.

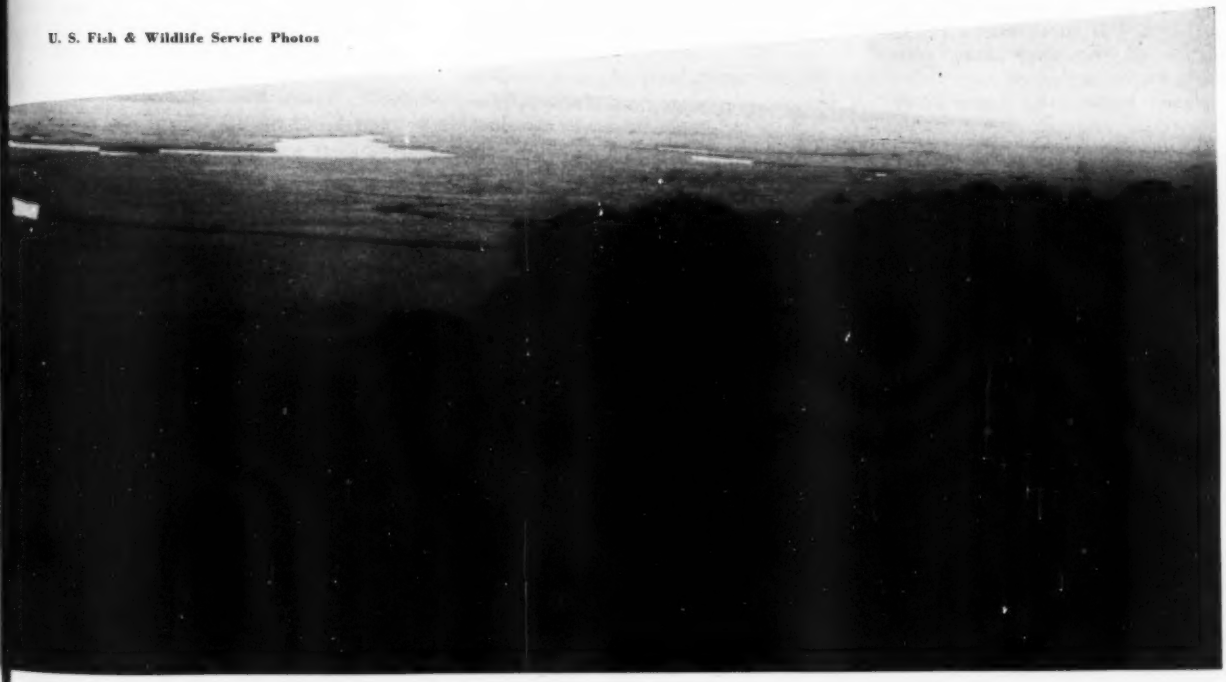
After two months of fruitless trapping, Hardy gave up the regulation traps and devised methods of his own. Along the well traveled trails he dug pits into the soft sand, camouflaging them with brush heaps, arranged to block the trails. Deer, leaping over the brush piles into the soft pits, were unhurt. They were removed with a sling hoist, deposited in shipping boxes and sent into the interior of the state, where they formed a basis for many of the Georgia herds today.

Within the past few years, however, the U. S. Fish and Wildlife Service, which administers the island, gave up its trapping program and inaugurated a different method of removing the surplus deer from their island. Following the precedent set by the U. S. Forest Service on its game management areas in the Blue Ridge mountains, it opened the island to limited hunting of deer with bow and arrow. From a dozen states each fall, nimrods who have renounced the gun for the long bow, flock to the island paradise for a week of stalking the overhung forest trails, or lying in wait with all the patience of a hungry Indian. One successful Robin Hood hunted from his belly on a huge horizontal tree limb overhanging the trail. Two years in succession he brought in his kill with an arrow through the heart.

The first deer hunt on the island was held in 1947. Not a deer was taken that year, but each succeeding season the nimrods have grown in skill with their long bows. On the last hunt, a dozen broadhead hunters brought in five deer out of the jungled woods, a much higher average than the other organized hunts on the management areas of the south, where hunters depend on high powered rifles.

Blackbeard lies above Darien, some fifteen miles off the mainland. It is reached only by boat or by a plane small enough to make a landing on the hard sand beach. It is typical of many of the coastal islands. Behind the crescent beach, the high land is covered with live oaks and a few pines, with an understory of palmettoes, gallberries and myrtle, intermingled with a dozen less well known varieties. Five miles from tip to tip and some two miles wide at its beam, the island contains 4800 acres of woodland and salt marsh. Within the past quarter century, in keeping with its original purpose of providing refuge for the wintering flights of migrant waterfowl, ponds totaling fifteen hundred acres have been constructed and supplied with fresh water from flowing wells. The largest of these ponds lies at the tip of the island, where much of the salt water marsh was reclaimed by a dam built between the ends of high land that lay like the pincers of a crayfish around the marsh.

U. S. Fish & Wildlife Service Photos



Blackbeard is the kind of a paradise reminiscent of the American wilderness four hundred years ago. It has changed little across the centuries since Edward Teach pulled his pirate ship into the river separating the isle from Sapalo, its big seagirt brother. Although it is small, this emerald garden spot is one of the few real, unmarred wilderness areas left in eastern America today.

FOREST FARM

By JAMES EVAN ALEXANDER

The Riegel Paper Company mixes Brahma cattle with pine trees on its 140,000-acre Carolina tree farm — with excellent results

BACK in 1918 the Waccamaw Lumber Company acquired several hundred thousand acres of virgin forests in southeastern North Carolina. Following the practice of the day, these acres, largely swampland, were heavily and carelessly logged and for a decade or more the grim story was written in the desolate cutovers.

There's nothing desolate or grim about the area today, however. A large portion of it—around 140 thousand acres—is a certified tree farm, which means the land has been dedicated to growing a new forest. Acquired by the Riegel Paper Company in 1937, the results of thirteen years of tree planting, fire protection and sound, common sense management are visible everywhere on the forest farm today. There are eighty-two miles of road; more than 800 miles of firebreaks have been constructed; pine plantations are flourishing over 600 acres, and the harvesting of trees in the early tracts will begin next year as a thinning operation. And there is what the Riegel people call "Operation Brahma."

This is unique in North Carolina. Seventy-five head of Brahma (or Brahman) cattle were imported from Florida and turned loose to range the savannahs and pine plantations in small herds. The theory was that this hardy animal would keep the undergrowth down by grazing, thus reducing if not eliminating in many cases one of the main fire hazards, while at the same time providing supplemental income to the overall farm program.

The mainspring that drives the Riegel farm is Forester Jim Lattay, a farm boy from Franklin County, Georgia, who received his forestry training at the University of Georgia, graduating in 1929. His early ambition was to become a logging engineer and, for four years, he worked in logging operations on the Pacific Coast.

But he was soon back in Georgia, as chief of surveys for the U. S. Forest Service in the Savannah-Waycross district. Later, in 1935, the North Carolina Department of Conservation and Development induced Lattay to head up fire control operations in thirteen southeastern counties. The fire fighting organization that is in operation today is the fruit of Lattay's efforts. This includes a system of fire lookout towers, radio and telephone communications to coordinate efforts of fire fighting crews, strategic location of

Of the 800 miles of firebreaks protecting the Riegel forest farm, more than fifty are planted to ladino clover and fesque 31 for the growing herd of Brahma cattle. Forester Jim Lattay and son are shown at right

heavy equipment and methods of dispatching fire crews and equipment to combat blazes wherever they appear.

When Riegel offered him the management of the farm, Lattay accepted with one stipulation—that he would be given a free hand. And he has had it. Today, though the farm has offices at the Bolton headquarters, he can seldom be found there between dawn and dark. By auto, truck, jeep and horseback, he prowls the vast swamp farm, constantly seeking methods whereby the area can be improved.

"We haven't done anything particularly unusual," he will tell you, "except take advantage of the things all of us in forestry know but often ignore. We started with the simple thought that if trees were to be harvested, they first had to be grown. From there it was only a matter of determining what trees were most suited, grew the fastest, and were most needed on the market.

"We've had some good breaks, too. This area is relatively free from infestation by bark beetle which is giving trouble elsewhere. Also, the disease known as 'little leaf' is not found here. In determining which trees to plant, we started with the ones that grew in the area before it was clear cut. These consist chiefly of pond, loblolly and longleaf pine. Slash pine is not native, but we've planted it with considerable success."

Since 1937 around 1,600,000 trees have been planted at the forest farm —800,000 loblolly pine, 380,000 slash pine, 350,000 longleaf pine, and 40,000 hardwoods.

"The planting of firebreaks with ladino clover and fesque 31—and we have fifty miles so planted," he grinned, "was the result of sheer laziness and a desire to save money, wear and tear on plowing equipment. Besides furnishing forage for the cattle, it is only necessary to run a mower over the firebreaks two or three times a year.

"A word about firebreaks. Many people have the idea they will actually stop a fire. This is seldom true. We use firebreaks as a means of access to areas—to get in ahead of the fire for quick handling. Plowed firebreaks permit access by tractor only; planted ones can be used for roads for trucks and jeeps."

Lattay gave the following answer to the question of why Brahma cattle were selected for the farm:

"I had been toying with the idea of putting cattle on the farm for some time, but was afraid that the cost of supplementary feeding would make the venture prohibitive. A friend of mine called my attention to the Brahmas. After investigating I chose them in favor of other cattle —for several reasons. One is that these animals will browse on shrubs and leaves that other cattle will not eat. The Brahmas have sweat glands not provided our domestic cattle. This enables them to keep cool, and they feed through the heat of the day which keeps them growing thriftily. You will notice, too, the Brahma has a hump somewhat similar to the camel in which fat is stored to provide energy during seasons of poor feeding.

The Brahmas presented quite a problem when they were first brought to Riegel. Dempsey Atkins, heavy equipment and dragline operator, was assigned to the duty of caring for the cattle. These animals were so vicious, and the areas in which they were grazed so dense, that bulldozers were used to herd them. Shortly after their arrival, Dempsey was caught away from his tractors and off guard by one of the bulls. His leg was broken and he was badly gored before other men in the area could rescue him. In spite of this, however, he was determined to make friends with the beasts.

Today, one of the most unusual sights on the farm is Dempsey driving down a woods road in his jeep followed by a herd of docile Brahmas.

Dempsey makes a daily count on all of the herds. His method is simple. He drives into the area where the herd was grazing the day before and blows several short blasts on the jeep's horn. As the cattle come out of the woods and gather around he feeds them vitamin pellets by hand while making his count.

"They soon learn," he confided, "that if they don't come to me they don't get a pellet."

Jim Lattay, the practical, summed up the value of the cattle to the tree farm. "One head of cattle can keep down the undergrowth on approximately twenty-five acres of land. We keep the herds divided and out of the new plantations, where they might trample the young trees, by building drift fences. To my way of thinking, this is one of the most effective methods yet found of reducing fire hazard to a minimum. Our increase in Brahmas is averaging about eighty percent annually, and by the sowing of additional firebreaks and supplementary pastures, we hope ultimately to build the herd up to about 2000."

Lake Waccamaw, scene of intensive logging thirty years ago, now reflects a young forest—part of the tree farm. In all, a million and a half young pines have been planted and harvesting will begin next year

Conservation through Modern Dance

By LYDIA BOURNE WALSH

The Orchesis, student dance group at Elmira College, uses Pare Lorentz's famous "Plow That Broke the Plains" for unique drama of the land

Prelude: "A country of high winds and sun . . ."

THERE'S more than one way to tell the story of conservation, but up at Elmira College, New York, a group of students has perfected a medium which must surely tax all challengers who aspire to the unique. The mode of expression is that of modern dance, accomplished in a presentation entitled "The Plow that Broke the Plains." The result is effective and highly impressive.

This unusual dance drama which the Elmira students present bears the same name and theme as a film produced by the U. S. Resettlement Administration in 1936. Even the original music as written by Virgil Thompson and the recitative as created by Pare Lorentz are used by the students.

However, the choreography, or dance arrangements, for all six parts of the drama was originated by different members of Orchesis, as the student dance group is called. In fact, the students never actually saw the film until after they had originated their own choreography and presented their drama to the public.

The story of the dance drama is a tale of land, not of people. The only property on the stage is an artistic suggestion of a plow as the dancers portray the story of what happened to bring about the tragic "Dust Bowl" condition of 1933. In the Prelude, three dancers portray, to the accompaniment of music and recitation, a theme of nature's self-sufficiency and an overshadowing of the disaster impending as a result of man's thoughtless abuse of the land.

The fluid movements of part two, entitled "Grass," suggest the wide expanse of fertile grasslands nour-

Drought: "With no grasslands to retain moisture, the plain becomes a dust bowl"

ished by the sun and swept by the winds. The liveliest movements of the entire dance story are in the beginning of the third part, "Cattle," which is danced to favorite cowboy tunes and suggests the pleasures and gaiety of American folk dance. However, "Cattle" ends with a somber effect which portends the destruction of the land through the approach of man and cattle.

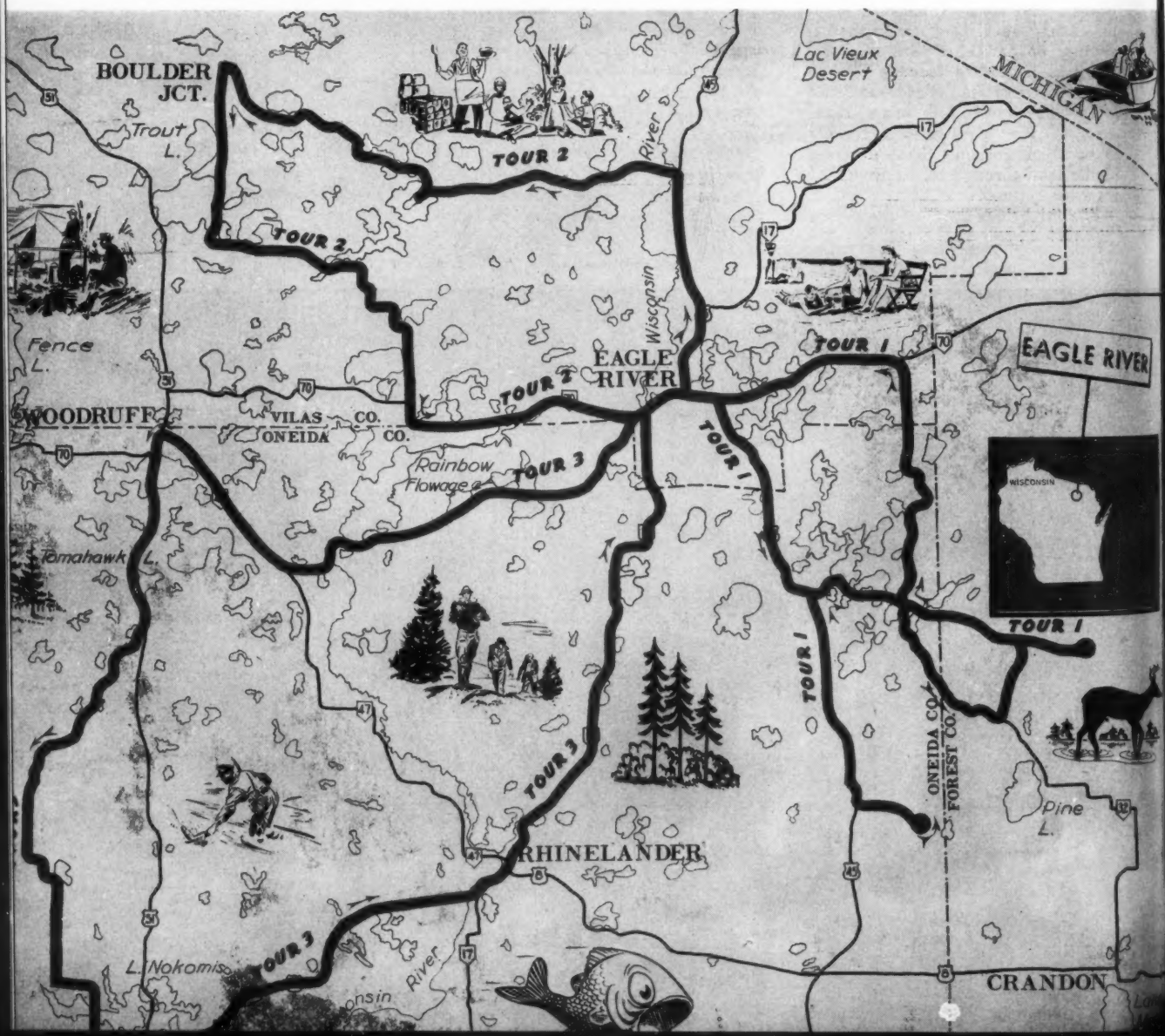
The final three parts of the drama are entitled "The Blues," "Drought," and "Devastation." Cynicism caused by the wheat speculator's desire for profit at the expense of the land forms the basis for "The Blues," and the movement alternates between an impersonal bitterness and useless despair.

"Drought" portrays the transformation of the living plain into a barren dust bowl. Instead of being nourished by the sun and swept by the winds as in "Grass," the land is scorched by the sun and devastated by the winds, for the grasslands which retained the moisture have disappeared. In "Devastation," the three original dancers of the Prelude reappear. Now they are hostile forces of nature, and the entire group of dancers falls before the stage plow. The tragic picture of the "Dust Bowl" is complete.

Devastation: "Hope of new opportunities lies in prayer for divine assistance"

Canada Joins in Wisconsin Meeting

75th Anniversary Meeting of AFA takes on added significance as Canadian Forestry Association, celebrating its 50th year of existence, makes plans to send a delegation to Eagle River. Robson Black, CFA's president emeritus, will be guest speaker at annual banquet October 10



MEMBERS of The American Forestry Association attending the 75th anniversary meeting in northern Wisconsin's picturesque Eagle River country October 9, 10 and 11, will have an opportunity to exchange greetings and cement friendships with their Canadian neighbors. Members and officials of the Canadian Forestry Association, currently celebrating its 50th year, will participate in the AFA meeting and make it an occasion for joint celebration.

Representing the Canadian Forestry Association in an official capacity will be Robson Black, widely traveled Canadian forestry pioneer who, until his retirement in 1948, served as president of his country's forestry association for thirty-three years. Mr. Black will occupy a place on the speaker's rostrum during the annual banquet the evening of October 10.

As previously announced, Dr. James P. Adams, provost of the University of Michigan, will deliver the principal address at the banquet, his subject being "Natural Resources in Human Affairs." AFA's Conservation Awards will also be presented that evening by A. C. Spurr, AFA president.

On October 9, forestry's overall progress during the past seventy-five years will be traced by three highly qualified speakers: R. E. McArdle, assistant chief of the U. S. Forest Service, Washington, D. C., representing the federal government; Joseph Kaylor, president of the Association of State Foresters and director of Forests and Parks for the State of Maryland, representing the forty-eight states; and D. C. Everest, chairman of the board of Marathon Corporation, Rothschild, Wisconsin, representing industry.

The new and different phase of this AFA meeting, however, will be a series of conservation motor caravans, using streamline buses. A narrator will keep members informed by means of a loudspeaker. First tour, on the afternoon of October 9, will include the Gagen Experimental Forest, a 2300-acre tract operated by Consolidated Water Power and Paper Company, and Timber Harvest Forest, a demonstration area established by Northern Lakes Forest Research Center.

On October 10 members will see Star Lake Plantation and a forest fire fighting exhibition in Northern Highland State Forest. The closing day will center on the Wisconsin River Valley and the famous plantations of the National Container Corporation.

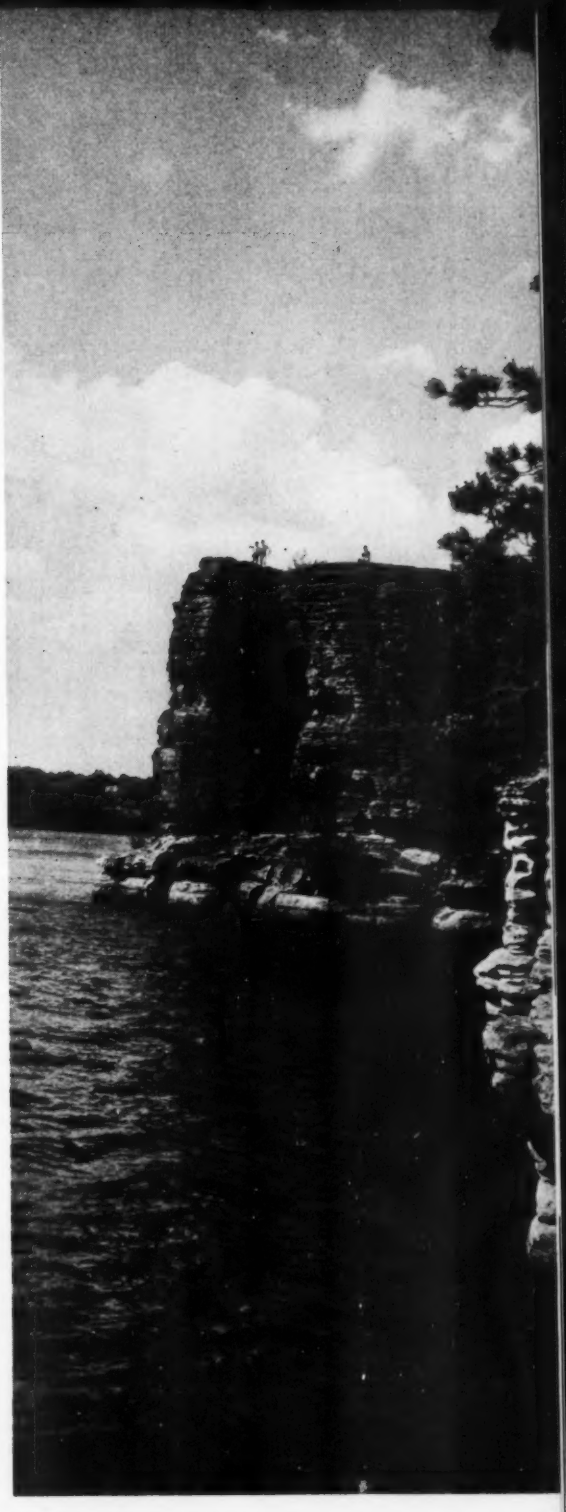
Dr. J. P. Adams

Robson Black

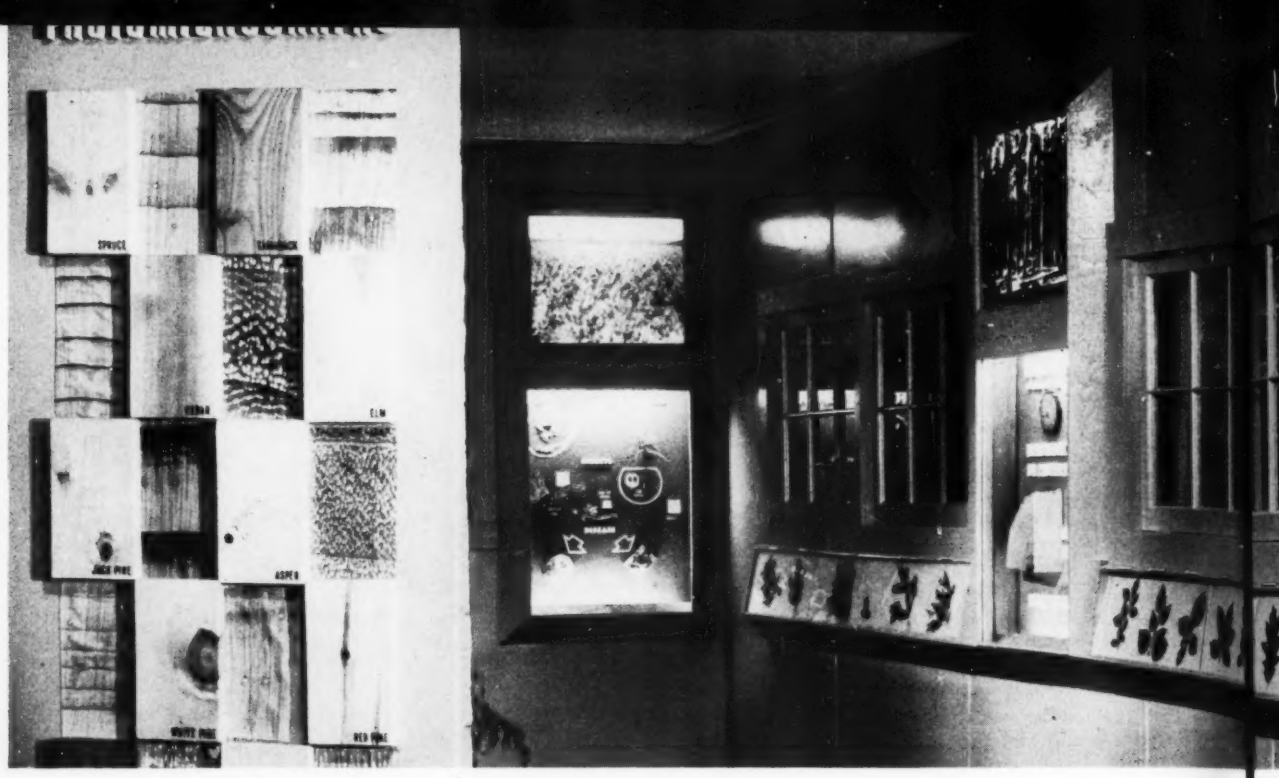
Joseph Kaylor

D. C. Everest

R. E. McArdle



If you haven't made reservations—Write Elsa Bloom, Information Bureau, Eagle River, Wisconsin, stating number in your party. You will receive a selection of housing accommodations and rates. Upon arrival, register at information booth at Chicago and Northwestern Railway station for assignment to hotel or resort. Transportation will be available at all times. All tours by bus only.



Wood samples on left are accompanied by photomicrographs which show wood structure in cross-section

NORTH WOODS MUSEUM

Those who attend AFA's 75th Anniversary Meeting at Eagle River, Wisconsin, will have opportunity to see and enjoy this unusual forest products exhibit in North Woods

IN the heart of northern Wisconsin's forest vacationland there is an unusual exhibit building devoted to educating the public about trees — how to identify them, how they grow and develop from tiny seedlings to mature trees, and how they are fabricated into a surprisingly large number of diversified products for consumer use.

Located at the Trees For Tomorrow conservation camp at Eagle River, where The American Forestry Association will hold its 75th Anniversary Meeting October 9, 10 and 11, this museum, or more properly the Forest Products Exhibit Building, is one of a group of six Forest Service structures constituting an ideal recreational and educational center. There is an administration building with classrooms, a dining room and recreation unit, two dormitories, an additional classroom-study building and the museum.

To this camp come teachers from high schools and colleges, students, members of women's clubs, scientific, educational and professional organizations, civic groups and other laymen groups interested in conservation.

The project is the result of cooperative efforts of many organizations and individuals. Among them are Marathon Corporation, Consolidated Water Power and Paper Company, Lake States Yeast Corporation, Rhinelander Paper Company, U. S. Forest Products Laboratory, Northern Lakes Forest Research Center and the U. S. Forest Service.

M. N. Taylor, executive secretary of Trees For Tomorrow, Inc., was coordinator for the exhibit building, and the writer did the art work, designing and arrangement of the vari-

By Hazel Stoick Stoeckeler

ous displays and the overall color and lighting scheme.

The building is a one-story frame structure, twenty by thirty-seven feet, located on the edge of a demonstration forest. The over-all plan includes five glass-enclosed exhibit cases with three-dimensional displays at eye-level, dealing with the following subjects: "First The Seedling"—"Forest Enemies"—"Forest Management"—"Wood To Pulp"—and "Research Yields Pulp By-Products." Above are illuminated color transparencies appropriate to the subject matter.

On one end wall is a larger glass enclosed case displaying "The Products Of The Forest" against a mural background. The center of attraction on another wall is a cross-section of white pine whose life history is correlated with significant historical episodes. Alongside the tree section is a scale model which explains steps in the manufacture of plastics from wood.

As an aid to tree identification, leaf specimens are mounted along the walls. Hanging from the ceiling near one end of the room is a plywood panel on which are mounted twelve samples of the most common species of wood in the Lake States region, accompanied by photomicrographs which show wood structure in cross-section.

For the first two cases, plastics have been used for embedding seeds, cones, seedlings, small trees and insects to retain their natural color and form. In the third case, actual sections of trees have been graphically juxtaposed to tell the story of forest management by tree rings.

Two variations of the flow chart technique of visual presentation were adapted. In "Wood To Paper" the effect of a three-dimensional flow chart was achieved by a schematic drawing of the stages in wood conversion, upon which were cemented materials such as wood chips, unbleached and bleached pulp, a finished roll of paper. Small abstract figures cut out of masonite emphasize the different steps.

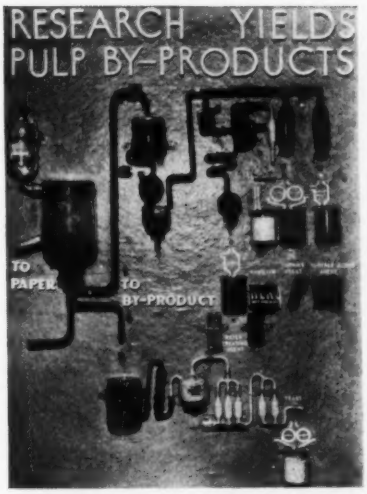
Chemical processes which are used in the production of by-products are symbolized by a flow chart blown in glass, filled with actual raw materials and chemical liquids. This technique, used in the fifth exhibit, is entitled "Research Yields Pulp By-Products." It shows the production of vanillin, tanning material, boiler compounds, and yeast from waste liquor.

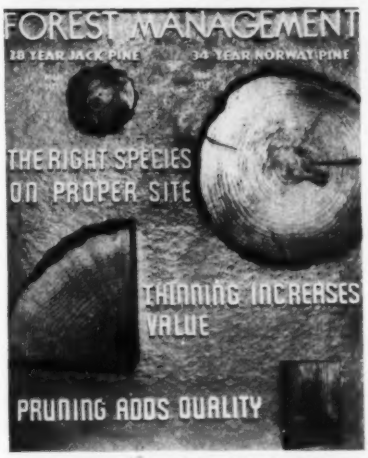
The blacklighted color transparencies which are above each of these display cases show school children planting trees, a well-managed forest, harvesting operations — mature hemlock—and a pulpwood loader.

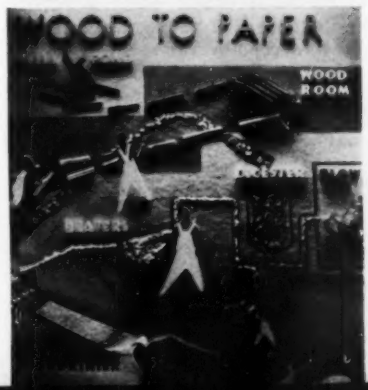
It takes a long time to grow large timber and this is graphically illustrated by the section of a 389-year-old white pine. It has been marked off with dates at approximately fifty-year intervals. From these pin-pointed dates, strings run off to either side and are connected to photographs depicting such events as the landing of the Pilgrims, the signing of the Declaration of Independence and Lincoln's Gettysburg address—all events which occurred during its lifetime.

In the museum, an illusion of greater space has been achieved by painting three walls a warm grey and one wall a bright yellow. The grey affords a neutral background for the brilliant colors of the various cases.

Lighting has been used to good advantage. The individual cases are illuminated by recessed fluorescent light, and, where necessary, are spotlighted by Versen swivel lamps. The tree section, plastic manufacturing display and photomicrographs panel are highlighted with floods.







That's the death knell you hear for the spruce budworm—scourge of the fir forests of the Pacific Northwest

War on the Budworm

By C. FRANK BROCKMAN

Photos by U. S. Bureau of Entomology

Spray nozzles were attached under bi-plane's wing

LOW flying planes startled many an early morning motorist on Highway 50, east of Mount Hood, Oregon, in June, 1949. Roaring along at 100 to 125 miles an hour, and so low that the tips of the tall firs seemed to brush the underside of the fuselage, these activities seemed foolhardy in the extreme. But the pilots were not stunting; theirs was a work-a-day task. They were engaged in a project sponsored by the U. S. Forest Service, the U. S. Bureau of Entomology and Plant Quarantine, and the Oregon State Board of Forestry which was designed to halt the destructive activities of one of the most deadly enemies of the fir forests of the Pacific Northwest—the spruce budworm.

As the planes passed overhead, a misty, yellow-green vapor could be observed in their wake. This was a mixture of DDT and fuel oil cast from a series of nozzles attached to the underside of the wings. As this spray settled slowly earthward through the heavy forest cover it enveloped the foliage, bringing to a close the destructive activities of the larvae of this insect which strips needles from the terminal shoots of the trees.

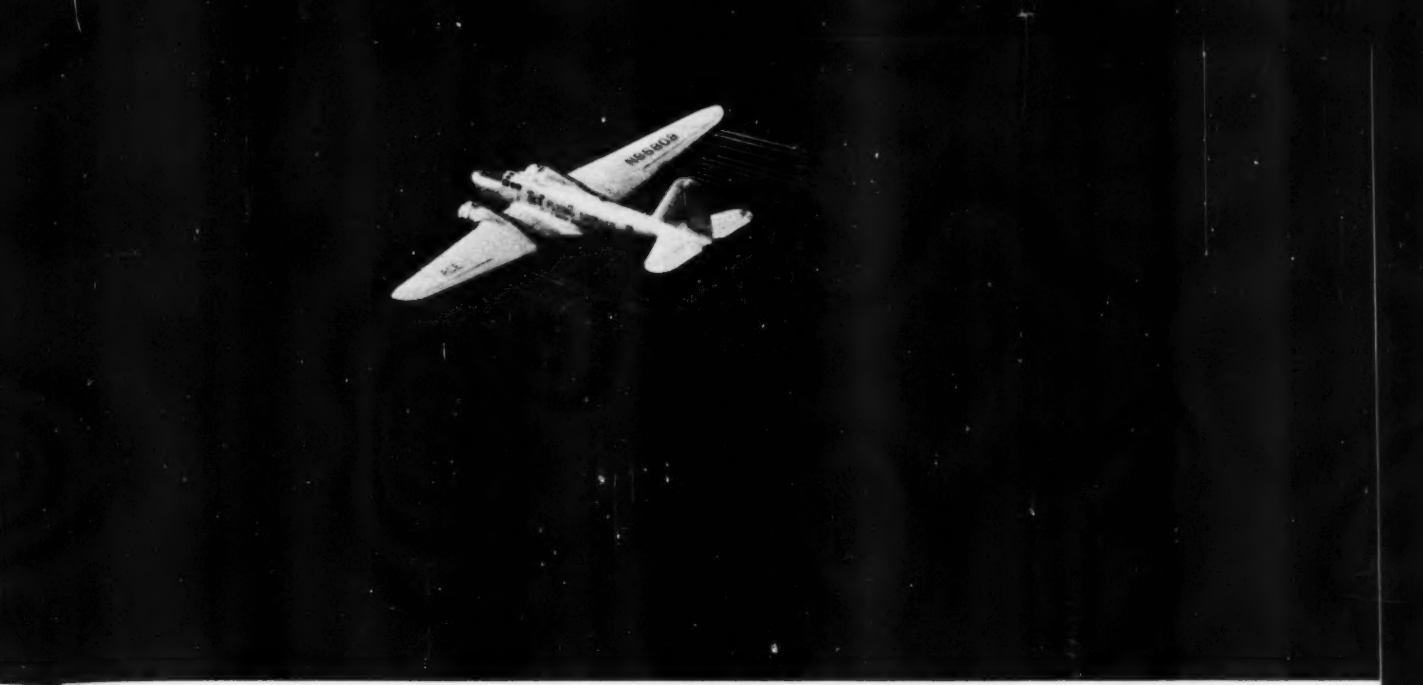
Similar spraying activities covered an area of 106 thousand acres—a region approximately thirty-five miles long and from four to twelve miles wide between elevations ranging from 2000 to 4500 feet. Based at an improvised air strip in a wheat field near the farming community of Wamic, planes flew over assigned areas, distributed their loads of insecticide and returned to refill their tanks. The actual spraying operation required fifteen days for thirty-six men and twelve planes to complete. There were 713 individual flights for spray application; and 106 thousand gallons of DDT spray were used.

Since the stumpage value of the timber in the infested area was conservatively estimated at $1,500,000, the cost of $1.20 an acre was remarkably low—particularly when the effectiveness of the operation is considered. Final check on results indicated a mortality of over ninety-seven percent of the larvae on the areas treated. Another important economic consideration was the protection afforded surrounding uninfected timber.

(Editor's Note — *Between early June and mid-July this year new thousands of acres of Oregon forests air sprayed by this continuing operation bring to a total a million acres that have been successfully treated. Preliminary field checks indicate the high larvae mortality—ninety-seven percent—is being maintained.*)

But this operation was far too complex to be described statistically. Like all projects of this magnitude—where timber values are high, the terrain rough and rugged, location remote, where too little is known about the local habits of the destructive agency, and where costs must be carefully balanced against values to be protected—an amazing amount of planning and organization are required. Those motorists who observed the planes quartering the area saw only the final step in this program. Like the iceberg that exhibits but one-fifth of its bulk above the surface, the greater part of the effort embodied in this project was discernible only to those who had a definite part in it.

For example, careful consideration of the biological, financial, and ad-



A Douglas B-18 bomber leaving fog-like lines of DDT spray in its wake

ministrative aspects of the problem, far in advance of the time when the planes finally began applying the DDT on the area, was necessary. One must first have a well grounded understanding of the life history of the insect for, in most cases at least, such an understanding will bring to light a vulnerable spot toward which controls can be most effectively directed.

In this case the only certain period of vulnerability was two or three weeks in June when the feeding and rapidly developing larvae were exposed on the branches. Further, the knowledge of the basic biology of the insect must be adapted to local conditions, for these often cause significant variations in the pattern of an insect's behavior. This data can often be used to forestall needless expenditures of effort and money.

For many years the spruce budworm has been an important enemy of balsam fir and spruce in northeastern United States and adjoining Canadian provinces, but only recently has it assumed aggressive tactics that demand attention by foresters in the Pacific Northwest. The reason for this is obscure, but the fact remains that since 1944 it has assumed epidemic proportions there.

Three major areas of infestation were evident in 1948. One was in the Blue Mountains of northeastern Oregon and southeastern Washington, a second on the eastern slope of the Cascades near Mount Hood, and a third was in the vicinity of Eugene, Oregon, west of the Cascade summit. The threat of greater damage to the valuable Douglasfir stands of western Oregon and Washington, which serve as the basic resource in the timber industry of the Pacific Northwest, was self evident unless some means of controlling these and other probable outbreaks were devised.

The first step toward the determination of the budworm's reaction to direct control under local conditions was taken during the early summer of 1948 on the Heppner ranger district of the Umatilla National Forest in Oregon. Here, near the center of the largest of the three infestations then existing in the Pacific Northwest, experiments concerned with the application of DDT in various concentrations, applied by both a fixed wing plane and a helicopter, were conducted on a number of carefully selected plots of definite size.

Results were carefully evaluated

so that the information gained could be used as a basis for later control projects of a more extended character. Briefly, this experiment indicated that the budworm in the Pacific Northwest reacted differently in some respects to direct control than did the same species of insect in the Northeast. A most important and gratifying conclusion was that a much higher degree of mortality could be expected.

But just as important as an understanding of the biological factors was the money necessary to pay for extended control operations. When, from the results of the Heppner experiment, it became evident that the budworm could be controlled at a cost that was justified on the basis of the values involved, a meeting of all interested parties was held in Portland to outline a plan of action.

Out of this meeting came the recommendation that, of the three areas of infestation, the one in the vicinity of Eugene be given first preference. The Mount Hood area was rated second and the Blue Mountain area third. Control priorities were based primarily on values involved, the danger of further spread,

(*Turn to page* 43)

Planes at Mount Hood air strip

CITIES WITH A FUTU

This is Klamath Falls with an area population of about 25,000. It is 293 miles south of Portland; 383 miles north of San Francisco.

World-famed Crater Lake is only 62 miles north of Klamath Falls. This area abounds in scenic wonders, fish and game. It is a natural vacation land.

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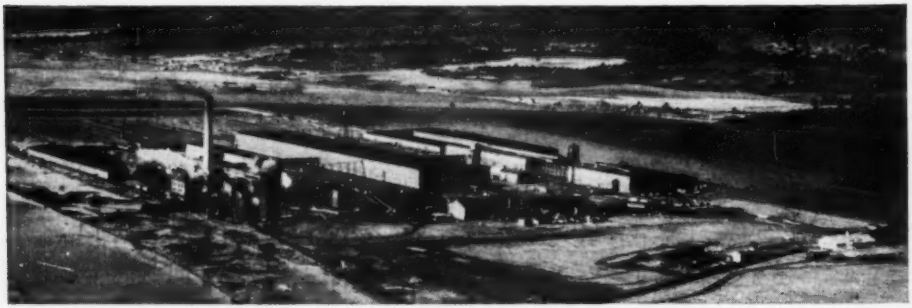

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An example is the Weyerhaeuser operation in this area. It is backed by the Klamath Falls tree farm, where modern selection harvesting has long been practiced. The plant includes a sawmill, dry kilns, planing mill, Pres-to-log plant, box shook factory and power plant—providing whole crop utilization. Additional wood processing facilities are in the plans stage. Company property was recently made available to another organization for experimental production of naval stores from pine stumps.

Klamath Falls is growing steadily—a city with a future!

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WEYERHAEUSER TIMBER IS A CROP FOREST PRODUCTS

They Still Call for Mules

By AL PEFFER

The parachuting smoke jumper is the dramatic figure in modern forest fire fighting—but the pack mule remains a highly respected member of the team. He's so important, in fact, that he rates an $18,000 taxi

WITH the summer fire season in the Northern Rockies at its height, ninety mules, ten horses and a fleet of trucks stand by at Missoula, Montana. The mules are specially trained to pack fire-fighting supplies and equipment, the horses are string leaders, riding animals for the packers. The trucks, three of them weighing 24,000 pounds each, are specially designed to transport both mules and horses at speeds ranging up to seventy miles an hour.

This unique remount depot to aid in the annual fight against forest fires is maintained by the U. S. Forest Service in its Northern Rocky Mountain region—and has been for almost twenty years.

Prior to 1931, pack animals provided the principal means of transport for supplies on large fires, but as trucks came more and more into use it became increasingly difficult to maintain an adequate concentration of animals at any one place. For a time, mules and horses were shipped by rail to the point nearest the fire, occasionally riding in the mail car of passenger trains. This did not prove feasible, however, for it often meant trailing the string many time-consuming and wearying miles to its destination.

To solve this problem, the Forest Service established the remount depot in 1931. Located twenty-five miles west of Missoula, it is an important asset to the Service. During the fire season, ten pack strings are stationed here for use throughout the region.

Each string is composed of one saddle horse for the packer and nine pack mules. All animals are transported to fires—as close to the scene as possible, that is—by a small fleet of trucks, three of which are the only ones of their kind in the country.

Boasting a 260-horsepower engine, each of these automotive behemoths weighs 24,000 pounds, *unloaded*. Each is thirty feet long, eight feet wide, and nearly twelve feet high. Each cost $18,500 and carries one complete pack string with all necessary equipment.

When the remount dispatcher receives a fire call for pack strings, he consults a book of maps showing the roads of all forests in the region. If the large trucks can't be driven to where the pack strings are needed, smaller trucks—each carrying five animals—make the trip. However, the large trucks are used whenever possible because of the greater ease and convenience of transporting the entire string as a unit. With more and better roads in the past few years, there aren't many places where the smaller trucks can go that the larger ones can't follow.

At least three pack strings are always on hand in a special corral next to the truck garage during the July-September fire season. As many strings as are needed are run through the chutes onto one of two loading platforms and into the trucks. The animals seldom act up while being loaded. After many practice sessions, plus actual experience, they are accustomed to the routine involved.

The packer's horse — along with two of the mules—is always placed in the front of the truck. For some reason, the horse will proceed to gnaw on the hindquarters of the nearest mule if stationed in the rear. Perhaps he resents temporarily losing his accustomed lead position to social inferiors. The center of the truck is occupied by four mules, and the three remaining members of the string are placed at the back.

Strong steel panels protect the rear and middle rows of mules from the steel-clad hoofs of their comrades in front of them. Each animal is fastened with a halter which has about eighteen inches of slack. This allows them to move their heads around without being too free. Occasionally, as the result of a fracas, one of the animals will fall to the floor of the truck. When this happens, the truck

must be unloaded and the fallen mule helped to its feet.

During the summer months—when the fire season is at its height—there are many kinds and sizes of insects in the air. To protect the animals' eyes from these insects, as well as overhanging branches on forest roads, each mule and horse is equipped with a canvas headpiece with built-in goggles.

Remount depot personnel take as much pride in getting to a fire promptly as does the fire department of any city. As soon as the call comes in, one of the drivers backs his truck up to the loading platform. Meanwhile, the other men have started a string through the chutes. As soon as the animals are loaded, tied and their goggles adjusted, the truck heads for the fire. It generally takes about fifteen minutes to load, from the time the call comes in until the truck roars out of the driveway. However, an official record of six minutes and forty seconds has been set for the complete operation. Feats such as this are attributable to the close cooperation of the packers who work together as well as any major league baseball team.

Just about every mule and horse at the depot greatly enjoys riding on the trucks. When they hear one approach, their heads come up and their ears lean forward alertly. When the gate to the loading platform is opened, they trot through and enter the truck without hesitation. One packer was almost crushed against the side of a truck one day when an over-enthusiastic mule galloped madly into the vehicle to take his position.

Each truck carries the necessary gear for the stock on board. This includes pack saddles for the mules and a riding saddle for the horse, saddle pads, canvases to protect the cargo and ropes with which to fasten it, and halters. Also, a sack of oats, a bale of hay, and a small horseshoeing kit are included.

The pack strings may be transported anywhere from the Montana-North Dakota border on the east to eastern Washington on the west, from the Canadian border on the north to Wyoming and central Idaho on the south. However, most of the trips are made to fires in the mountainous western half of the region. Last summer, pack strings were sent to a large fire in the northwest corner of Yellowstone National Park. The longest trip made to date involved traveling approximately 1000 miles to a fire in Washington's Chelan National Forest. The only good road from western Montana to this section of Washington follows a circuitous route through Canada.

Demand for this modern mule-motor truck project has not slackened because of smokejumping operations. Pack strings are now needed to bring out the jumpers' gear as well as for their time-honored function of packing supplies into remote fire camps.

As far as the Forest Service is concerned, the scheme is the answer to a lot of questions. Mules can't go very fast or far under their own power, and trucks are confined to roads—but mules and trucks together form a team that's hard to beat.

U. S. Forest Service Photos

A pack string of nine mules and one horse ready for a fire run in special 24,000-pound truck. This giant, capable of seventy miles an hour, will rush the animals from remount depot at Missoula, Montana, to where they are needed in the Northern Rockies for transport of supplies (below) to fires in remote forest areas. Canvas headpieces with built-in goggles protect the animals' eyes from injury

Disease Resistant Mimosa Trees

Pathologists with the U. S. Department of Agriculture have developed a new strain of ornamental mimosa trees immune to wilt causing fungus

By E. RICHARD TOOLE

THE selection and propagation of plants resistant to various diseases is a commonly accepted practice with agricultural crops. In the case of trees, it is a relatively new method of disease control. The recent development of disease-resistant mimosas or silktrees, however, shows what can be done and offers the best hope at present of saving this fragrant, flowering species, a favorite southern shade tree.

The mimosa tree is the most cosmopolitan member of the genus *Albizzia*, which consists of about forty species of trees or shrubs widely scattered throughout the tropics and subtropics of Asia, Africa and Australia, with a single species occurring in Mexico. This tree occurs naturally through the warmer temperate portions of Asia, from Persia to Japan. It was apparently first introduced into Europe about 1745.

The first known mention of mimosa cultivation in the United States occurred in a catalog issued by the nursery of William Prince and Sons in 1831, and now the tree is thoroughly naturalized in the southeastern states. Because of its handsome foliage, attractive flowers and rapid growth on a variety of sites, the mimosa is a valued ornamental. In other countries it is used for dune fixation and shade for tea bushes; its wood is valued as a finishing material, and the fragrant flowers are used in the manufacture of tea.

A threat to the continued use of the mimosa in ornamental plantings in the United States arose in 1935, when the attention of pathologists was called to the wholesale dying of these lovely trees at Tryon, North Carolina. Local residents reported the trouble had begun about 1930. It was found that the foliage of diseased trees often wilted suddenly, and the tree died soon after. Upon cutting into stems of affected trees, investigators found a discoloration of the outer sapwood, and a fungus of the wilt-causing group of the genus *Fusarium* was readily isolated from the discolored wood.

In order to determine whether the *Fusarium* commonly associated with wilted mimosa trees caused the wilt, it was necessary for the pathologists to inoculate healthy trees with this fungus. As a result of a series of inoculations, it was found that this *Fusarium* caused mimosa wilt; that the source of fungus infection is in the soil; and that the fungus enters the roots and spreads upward in water-conducting tissue, causing wilting and rapid death. The spread of the fungus to new locations takes place by movement of infested soil

(*Turn to page* 40)

Wilt-resistant mimosa seedlings and cuttings propagated in the Department of Agriculture nursery near Tryon, North Carolina

Foliage of diseased trees will often wilt suddenly

"best woods tractor built"

Up in Idaho's Potlatch Forest, operator Walter Paterek tells this tale of the International TD-24 in the tough timber country.

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NEWS IN REVIEW

At the time of going to press, critical forest fires had exploded in California. In San Diego County flames had already seared 56,000 acres of national and state forest lands with the fire still out of control. Twenty cabin-type homes, as well as recreation and camping facilities had been ruined. Greatest damage was the destruction of foliage which protects the mountain from erosion and retains the storm runoff that feeds the lakes and reservoirs of the water-short county. During California's worst July in twenty years, 95,000 acres of forests burned.

The roundup of the fire situation elsewhere:

Pacific Northwest—danger normal at present except for extremely dry conditions developing in southern Oregon and lightning storms east of the Cascade Mountains.

Northern Rockies — recent rains have held back danger, but drought and rising wind indicate serious burning conditions on way.

Central Rockies — normal at present, critical conditions expected to develop in late August.

Southwest — Mid-July rains improved situation, danger only moderate.

Great Plains — Situation normal, with no serious outbreaks.

North Central—with favorable distribution of rain, situation is exceptionally good.

South and Southeast—danger low or average, no danger spots.

Middle Atlantic and Northeast—except in northern Maine, where moderately high danger exists, conditions generally favorable.

The Society of American Foresters has announced plans to hold its Golden Anniversary meeting, commemorating the founding of that organization in 1900, in Washington, D. C., December 13 to 16. The first general session on December 14 will have as its theme "The Society Takes Stock," and the final general session on the closing day will center on "The Society Looks Ahead." Charles F. Evans of Atlanta, Georgia, Society president, anticipates an attendance of 1000 members and guests. Society membership now totals 6800 technically trained foresters in the United States and Canada.

Outstanding American foresters and others who have made major contributions to the advancement of forestry over the past fifty years will be honored at the annual banquet on December 15.

Special United Air Lines flights that speed fire-control experts to trouble zones hundreds of miles distant have proved increasingly valuable in battling forest fires in western regions. Recently when flames swept through forests near Salinas, California, fire-fighting experts from Oregon arrived within a few hours via a United Air Lines Mainliner. Rangers boarded the special flight at Portland, Bend, and Klamath Falls for the speedy trip. Ordinarily the trip would have required twenty-four hours.

Alma Deane Fuller, until recently national publicity representative for the American Junior Red Cross in Washington, D. C., has been named director of the education division for American Forest Products Industries. In her new duties, Miss Fuller will work closely with educators, urban and rural youth groups, women's clubs and others interested in encouraging better woodland management and protection.

Dutch elm disease is striking hard blows in the National Capital. Within the past few weeks a number of the city's oldest and highly prized American elms have been removed, including a sixty-foot tree in front of the White House, planted during the Grant administration. Since there are more than 30,000 elms in the District of Columbia, vigorous steps are being taken to check the disease, first reported in the city in 1947.

Reforestation reached an all-time record peak in the South during the past winter and spring tree planting season, the Southern Pine Association has announced following a survey of forest nurseries operated by twelve states.

Total seedling distribution amounted to 212,749,317, an increase of more than 50,000,000 over the previous season. Future plans, reported in the poll, call for even greater reforestation activities during the forthcoming planting season.

Private industry sparked the tree

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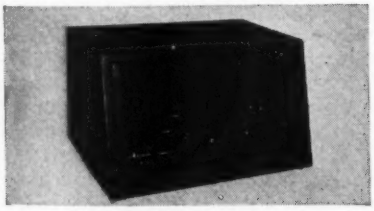

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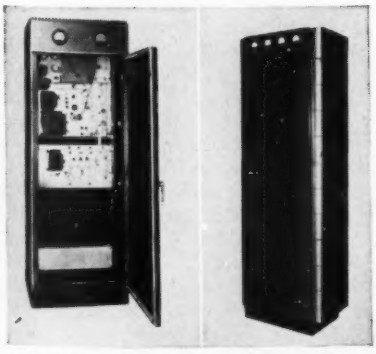

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• Station Fleetfone 250 watts

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planting boom by purchasing fifty-five percent of the total nursery output. State foresters, cooperating in the survey, reported the pulp and paper industry accounted for twenty-four percent of the seedling purchases, the lumber industry twenty percent and other industries eleven percent. Industries distributed approximately twelve million seedlings free of charge to landowners and youth groups while planting more than 100 million seedlings on company lands.

States covered by the survey, and the 1949-50 seedling production, include: Alabama, 13,474,420; Arkansas, 13,815,600; Florida, 28,975,346; Georgia, 44,487,075; Louisiana, 32,197,835; Mississippi, 12,631,000; North Carolina, 9,234,000; Oklahoma 2,600,000; South Carolina, 34,460,355; Tennessee, 942,743; Texas, 15,700,943; and Virginia, 4,230,000.

A total of 337 industries participated in the record-breaking reforestation movement. Several of the firms supplemented the state seedling production by operating company nurseries.

Secretary of Commerce Charles Sawyer recently merged the Office of International Trade and the Office of Domestic Commerce to form a new bureau, the Office of Industry and Commerce. This merger included a consolidation of the Forest Products Division of OIT and the Forest Products Section of ODC.

Harold E. Holman was appointed chief of the merged Forest Products Division under the OIC.

Mr. Holman has made the following appointments: J. L. Muller, chief of the Lumber, Plywood and Allied Products Section; Leroy Neubrech, chief of the Pulp and Paper Section; A. Fivaz, chief of the Primary Forest Products Section.

Hugh W. Dobbs, land manager for the Georgia Power Company, was elected president of the Georgia Forestry Association at the recent meeting of that group in Atlanta. Other officers elected included R. H. Rush, first vice-president, and Harley Langdale, Jr., second vice-president.

In 1948 the forest products industries in Louisiana marketed $200,000,000 worth of products, provided jobs for 47,000 workers and paid out $80,000,000 in wages.

The lumber industry gave jobs to 26,000 workers, the pulp and paper industry employed 15,000. Finishing plants, creosoting operations, furniture factories and other wood processors hired 6,000 workers.

If the state's pine forest lands were fully stocked, properly managed and protected from fire, they would produce 500 board feet of timber per acre per year. This means that in time Louisiana's forests could provide 100,000 new jobs, $200,000,000 additional annual wages and $45,000,000 for forest landowners annually.

Tree poisoning and aerial mapping will be used in the battle to be launched this year against the pole blight threatening white pine timber stands in northern Idaho.

It is hoped that spread of the disease can be halted by poisoning infected trees.

Aerial mapping will be used to locate pole blighted areas. The air surveys will serve as guides to timber owners who will then know when and where to salvage blighted trees.

The survey will be conducted by the U. S. Department of Agriculture's Division of Forest Pathology. The University of Idaho and the Northern Rocky Mountain Forest and Range Experiment Station are cooperating with the division in a program to find the cause and cure of the blight.

The amount of wildlife killed by forest fires is brought home in a report by Special Agent John E. Hickey of the Missouri Conservation Commission after visiting a burned forest area along the Henry-Benton County line.

"I walked about two miles through the area and saw the charred remains of many kinds of wildlife—mostly young rabbits, birds, frogs and squirrels. No doubt a great many escaped but with horrible burns. All young trees were destroyed or damaged and no sign of life of any kind remained to be seen," Mr. Hickey reports.

From the Brown Company of Berlin, New Hampshire, comes an announcement of an offer of free spruce seedlings to be distributed on the basis of a seedling for each tree which the company purchases in the form of pulpwood. The offer is part of the company's program of improved forestry practice and intelligent utilization of forest resources. Under the plan, a producer supplying Brown Company with 500 cords of pulpwood would be entitled to 4000 free spruce seedlings with which he can replace the trees he has harvested.

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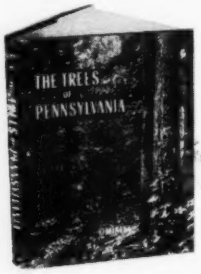

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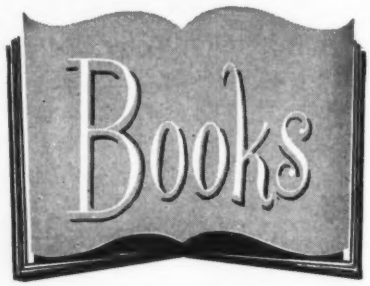

ENCYCLOPEDIA OF WORLD TIMBERS, by F. H. Titmuss. Published by Philosophical Library, Inc., New York City. 156 pages. Price $4.75.

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THE AWL-BIRDS, by J. K. Stanford. Published by Devin-Adair Company, New York City. 90 pages, illus. Price $2.

The avocet, a most spectacular shore bird, known to the English as the awl-bird because of the resemblance of its bill to a cobbler's awl, has furnished J. K. Stanford inspiration for a bit of finely sensitive writing. The author, a young war veteran and one of England's top ornithologists, describes the return of the avocet to England after an absence of more than a hundred years. The story is based on fact, but the actual breeding site is kept a carefully guarded secret.

FOREST MENSURATION, by H. H. Chapman and Walter H. Meyer. Published by McGraw-Hill Book Company, Inc., New York City. 522 pages. Price $5.

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TEXTBOOK OF WOOD TECHNOLOGY, Volume I, by H. P. Brown, A. J. Panshin and C. C. Forsaith. Published by McGraw-Hill Book Company, Inc., New York City. 652 pages. Price $6.

This book deals with the structure, identification, defects and uses of

commercial woods of the United States. It is a complete rewriting and revision of Brown and Panshin's well known *Identification of Commercial Timbers of the United States*, and will be followed by a second volume dealing with the physical, mechanical and chemical properties of wood.

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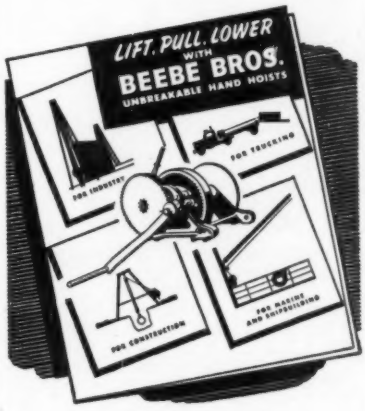

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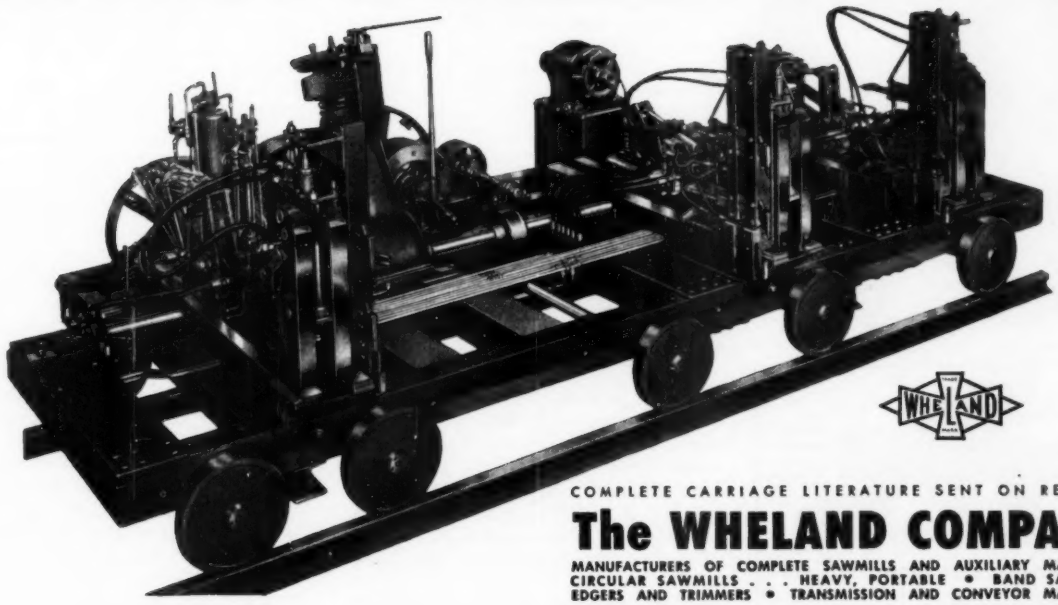

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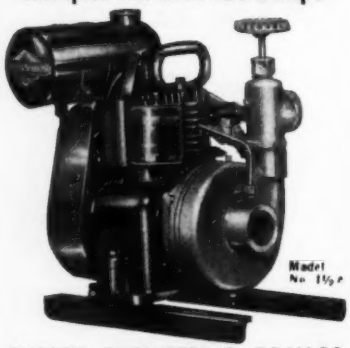

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Wisconsin Valley

(*From page 9*)

dam with a pair of huge penstocks (pipes) that carry the entire river clear around the rapids and drop it onto the waterwheels in a single 95-foot leap. In the new Grandfather Falls plant, say engineers, northern Wisconsin has "one of the sweetest and most efficient hydro units in the U.S."

Without power from the river, the valley could not furnish a decent living to half its population, which now numbers 615 thousand. Most of central Wisconsin is poor land. Dairying is the most intensive kind of farming the soil will carry; settlers cleared much land which should never have been farmed at all and is only now being put back in trees. The only important mineral resource is a single deposit of roofing gravel. Delivered in Wausau, biggest town in the valley, coal costs 1.2 cents a kilowatt hour—twenty percent over the delivered price of industrial electricity anywhere in the state. But abundant water power and skills give nearly all valley families two jobs and two pay envelopes—one in dairying and one in a factory, most often in a paper mill. Over half the valley families, farm and town alike, have at least one member working in the $200,000,000-a- year paper industry.

In carrying through its program for developing the river, the WVIC has been greatly helped by a shewdly-drawn charter and set of by-laws. To begin with, the WVIC is the sole water storage agency on the river and has a full complement of such powers as the right to acquire land for reservoirs by condemnation. All water power users on the Wisconsin are required to join the improvement company, and they must be given a voice and stock in the company proportionate to their power capacity. Finally, two novel provisions of the by-laws endow the WVIC with real financial muscle.

First, member companies must pay for water whether or not they actually utilize it for making power. So long as a member uses any water at all for power in two months of a half year, all the water that could have been used had its generators run full time must be paid for. Second, if a WVIC member passes into bankruptcy, the water tolls are a first lien after taxes on the member's revenues; the valley company, in other words, has precedence over all creditors except the government. The improvement company, as a result, enjoys a guaranteed income and is able to raise money at rock-bottom cost, an essential of long-range undertakings like river development. On the other hand, the WVIC is bound by a series of provisions which effectively protect the interests of the public, such as the requirement that enough water be kept in the controlled-lake reservoirs—which are all at the upper end of the river—not to spoil the vacationland character of northern Wisconsin.

Even more than to its charter and by-laws, the success of the improvement company is due to two unusual individuals who have been its prime movers for more than thirty years, and who have also taken a leading part in the affairs of Trees for Tomorrow, Inc. One is George W. Mead, president of Consolidated Water Power and Paper, the magazine paper firm, and of the WVIC. Still on the go at eighty, Mead has spent a lifetime aggressively pushing the development of the Wisconsin. He was personally responsible for the construction of the Eau Pleine Reservoir, currently the largest in the WVIC system; he put up the difference between what Eau Pleine cost and what other WVIC members could afford to invest (Eau Pleine was built during the depression).

It was through Mead's influence, also, that Consolidated Water Power and Paper undertook the construction of Du Bay Dam, one of the largest and most successful power projects on the river, over the objections of a respectable number of experts who thought that the shifting, sandy bottom of the Wisconsin there made that a poor dam site. In addition, Mead was the first to propose the big reservoir which will eventually bear his name and for which he began acquiring land, to be turned over to the WVIC when construction starts, as far back as 1927.

The other of the WVIC's prime movers is D. Clark Everest, president of the Marathon Corporation, and vice-president of the valley company. Also widely known for his aggressive sponsorship of research on the utilization of wood pulp waste, Everest, now in his late sixties, is a match for Mead in the tenacity and foresight with which he has pushed for development of the Wisconsin.

Besides being the WVIC's most ambitious undertaking, the projected

(*Turn to page 41*)

NEW PRODUCTS

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Kraft Paper Sleeping Bag—a new type sleeping bag made of heavy two-ply asphalt laminated kraft paper lined with a total of three pounds of cotton batting. External seams are bound with heavy draft crepe paper. An extra long flap provides shelter for the user's personal effects. The bag weighs 5½ pounds, is 6 feet, 6 inches long and 3 feet wide. Western Fire Equipment Company, 69 Main Street, San Francisco 5, Calif.

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Mimosa

(*From page 28*)

or infected trees. The mimosa *Fusarium* was found to be alive in soil taken from around diseased trees and kept air-dry in the laboratory for several years. Thus, any ready means of transport of infested soil, such as shoes or automobile tires and fenders, could serve to spread the fungus.

Despite the fact that the fungus is not known to be windborne, the mimosa wilt has spread rapidly. In 1935, Dr. George H. Hepting, pathologist with the U. S. Department of Agriculture, who did the early work on the disease, found about 600 large mimosa trees at Tryon. Five years later all except forty-five of these trees had been killed by the wilt. Within a year of its discovery at Tryon, the disease was found near Bishopville, South Carolina, more than 100 miles away. At the present time, the mimosa wilt is known to occur in eighty-two counties in six States from Maryland to Alabama, and it is probably only a matter of time until it will attack other wilt-free areas.

The rapidity of spread of mimosa wilt is further illustrated by its history in Morganton, North Carolina, "The Mimosa City." In 1943, when the wilt was first discovered there, the disease was affecting a few trees in one city block. By 1945 it had spread to twenty-two blocks, and by 1948 thousands of trees in 457 city blocks had been attacked by mimosa wilt, leaving practically no area within the city free of the disease.

Because the mimosa wilt *Fusarium* is closely related to the *Fusaria* causing wilts of many crop plants, it was desirable to discover whether or not this fungus could attack other kinds of plants. Inoculation experiments on several native leguminous trees have shown them to be immune to mimosa wilt, but some other species of *Albizzia* closely related to the mimosa are susceptible.

With the cause of the disease determined, and its seriousness established, consideration was given to all possible control measures. Because the fungus attacks through the roots, sprays or other external treatments applied to the leaves and branches would not be effective in combating the disease. Preliminary results suggest that the application of fungicides to the soil may be useful for the protection of valuable trees.

However, the development of wilt-resistant mimosas is considered to be the most promising permanent solution to the problem. Experience with other *Fusarium* wilts has shown that resistant strains of a susceptible species often occur. For example, there are strains of tomato, tobacco, cotton, and many other plants that are resistant to *Fusarium* wilts. Accordingly, in the winter of 1939, over a thousand mimosa seedlings were grown in the greenhouse from seed collected at various locations from Maryland to Louisiana, and tested for resistance by inoculation. Twenty of these trees are growing vigorously today at Tryon, despite repeated inoculations with the fungus.

Seedlings from these resistant trees were not uniformly resistant, and it was necessary to increase the resistant stock vegetatively. Experiments over a period of several years show that wilt-resistant mimosa trees can be propagated most readily by means of root cuttings. All cuttings rooted from the resistant trees have proved to be resistant, while cuttings from nearby wildling trees quickly succumbed to the wilt.

The resistance tests have shown without question that certain strains of the mimosa tree possess a high degree of resistance to wilt, and that these strains may be readily propagated by root cuttings. At the present time the resistant stock is being increased in a U. S. Department of Agriculture nursery at Tryon. It is hoped that in a few years wilt-resistant mimosa trees will be available to everyone through commercial channels.

AUTHORS

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Wisconsin Valley

(*From page 38*)

Mead Reservoir will be quite unusual technically. Several decades ago, there used to be a small lake on the Little Eau Pleine River, a tributary running into the Wisconsin from the west. The lake and a large surrounding marsh were drained to make room for farms, most of which were soon abandoned as the soil was poor. The lake and marsh form a large natural reservoir basin.

However, the Little Eau Pleine itself can fill the reservoir only a quarter-full. The balance will come from the Wisconsin. Huge pumps, operated at night on "dump" power, which would otherwise go to waste, will lift surplus spring runoff from the main stream to the Mead basin. Released later, the stored water will enable the dozen dams below the reservoir to generate ten times as much current as was needed to pump the water into storage in the first place—all of it useful power. "Pump storage," as the scheme is called, has been used a number of times in Europe, only once before in this country—on the Little Miami in Ohio.

The Mead Reservoir will be twenty miles long and nine wide and will hold eighteen billion cubic feet of water—more than all the present WVIC reservoirs together. The start of construction awaits only more normal land prices.

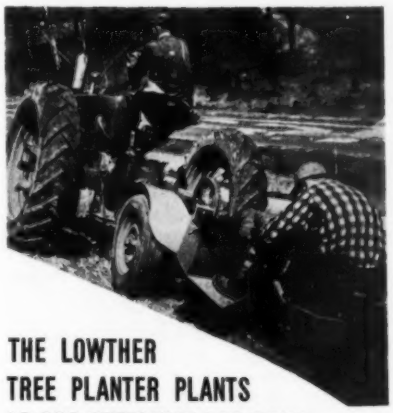
The WVIC has its headquarters in a middle-aged bank building in Wausau, a town of 26,000 almost exactly halfway between the Wisconsin's source and its mouth. Presided over by General Manager Merville W. Kyler, a veteran of a quarter century on the river, the office is the center of a lively traffic.

Controlling the flow of a river is something like a game of musical chairs, with water for the players and the reservoirs as chairs, except that the problem may be not enough players quite as often as not enough chairs. In fact, recently, the former has been very much the problem. During the last three winters, the valley experienced a severe water shortage. Steam-generated current was wired in from Green Bay, over on Lake Michigan; nevertheless, lighted display signs had to be banned, the strings of colored street lights that customarily grace the river towns at Christmas were kept in storage, and factories had to run at part capacity.

The shortage was due in part to abnormally low rainfall and in part to man-made changes in the face of the valley. Before the white man arrived in Wisconsin, the entire state was covered by a magnificent forest whose floor was broken up into countless hummocks and hollows by the half-rotten bones of previous generations of trees. The hollows acted as tiny reservoirs, holding the rain until it could soak into the ground. The hummock reservoirs were indispensable, for Wisconsin is the site of an ancient mountain system whose wearing away through eons of time has brought the land close to bedrock, covered in many places only by a thin layer of pulverized granite soil which is slow to absorb surface moisture.

When the forests were felled and the land cleared, the hummock reservoirs were destroyed. Rain water consequently runs off quickly. This has had the effect of simultaneously increasing the danger of flash floods and reducing underground storage, thus leading to water wastage and water shortage.

One of the obvious things to do is to put back into trees land which is now idle or which can't properly support farming. This would also



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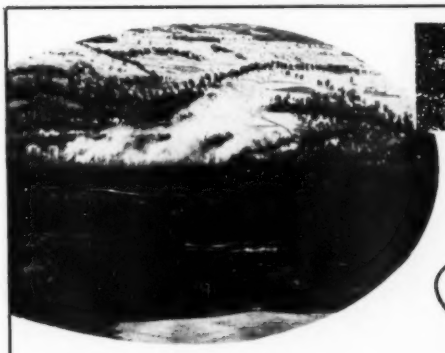

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Reforestation is outside the immediate province of the WVIC. However, member paper companies have been putting trees back onto their lands for over twenty years. So far, thirty-five million trees have been planted on 300 thousand acres, and new projects are continually being launched; this spring, for example, Consolidated Water Power and Paper initiated a large-scale project for the Du Bay Dam flowage area. More important, in 1944 the nine WVIC paper companies and one of the member public utilities launched Trees for Tomorrow, Inc., a semi-public corporation similar to the improvement company, to persuade and assist farmers and other private landowners — who hold by far the greater part of the land in the valley —to plant and harvest trees as a crop.

Over 3,500,000 trees have been planted on private lands directly through its efforts; and scores of Wisconsin schools now maintain school forests as living conservation demonstrations and future sources of income.

It would be foolish to contend that either Trees for Tomorrow or WVIC has finished its job. Much remains to be done in the way of reforestation, and there are reservoir and dam sites still to be developed. However, an enormous amount has already been accomplished through the initiative of the valley companies and without waiting on the federal government.

Elections

(*From page 4*)

comes the name or names of persons which any member of the Association wishes to have considered for these offices.

In addition, nominations may be made in the form of a petition signed by not less than twenty-five members of the Association. In submitting suggested candidates or nominations to the Committee on Elections, members are urged to include qualifications of the individuals.

Suggestions for the Committee, as well as nominations by petition, should be addressed to the Committee on Elections, The American Forestry Association, 919 17th Street, N. W., Washington 6, D. C. Petitions must be received by November 1, 1950.

Carr Heads Chamber's Resources Committee

Former Governor Ralph Carr of Colorado, an outstanding authority in the field of water resources problems of the western states, has been named chairman of the Natural Resources Committee of the Chamber of Commerce of the United States.

The committee includes Paul Clement, secretary, Minnesota Commercial Men's Association, Minneapolis, and Edward J. Condon, assistant to the president, Sears, Roebuck and Company, Chicago, representing the broad field of conservation; Governor Carr, Charles W. Deterding, Jr., county executive, Sacramento, California, Millard G. Scott, Huron, South Dakota, and Paul Weir, general manager, Atlanta (Georgia) Water Works, representing water resources and reclamation.

Representing the lumber, pulp and paper fields are Bertram E. Claridge, vice-president, Hammermill Paper Company, Erie, Pennsylvania; Abbott Fox, Abbott Fox Lumber Company, Iron Mountain, Michigan; A. J. Glassow, vice-president and general manager, Brooks-Scanlon Lumber Company, Bend, Oregon; Julian F. McGowin, secretary-treasurer, W. T. Smith Lumber Company, Chapman, Alabama; W. S. Rosecrans, chairman of the California State Board of Forestry, and former president of The American Forestry Association; Rand N. Stowell, Timberlands, Incorporated, Dixfield, Maine; and O. T. Swan, secretary-manager, Northern Hemlock and Hardwood Manufacturers Association, Oshkosh.

Representing grazing and public lands are Frederick P. Champ, Logan, Utah; Forrest E. Cooper, counsel, Interstate Association of Public Lands Counties, Lakeview, Oregon; Floyd W. Lee, president, Fernandez Company, Albuquerque, New Mexico; E. L. Moulton, president, Charles Ilfeld Company, Albuquerque; and William B. Wright, Mary's River Ranch, Deeth, Nevada.

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Budworm

(*From page 23*)

and similar practical considerations. A program for the financing of the proposed projects was also worked out, with the federal government, the State of Oregon, and private timber owners sharing proportionately in the necessary expense.

The first two projects were undertaken during the summer of 1949, the methods used and the results being essentially the same. However, the program in the Eugene area, due to the fact that the State of Oregon and private operators had a greater stake in the acreage concerned, was administered by the Oregon State Board of Forestry with biological assistance furnished by the U. S. Bureau of Entomology and Plant Quarantine. On the federally controlled Mount Hood area, the program was administered by the U. S. Forest Service, with a like assist in the biological aspects.

In preparation for control on the Mount Hood area, biologists of the Bureau of Entomology from the Forest Insect Laboratory in Portland began preliminary investigations soon after the first of the year. It was first necessary to outline the boundary of the infested area and to determine the exact time when the larvae would have progressed to the point where they would be most vulnerable to the effects of the DDT spray. The general outline of the infestation had been previously spotted by means of the regular, annual air reconnaissance survey, but ground studies of a more detailed nature proceeded as fast as road and trail conditions would permit. Thus the extent of the infestation was mapped well in advance of actual spraying operations. Further, the area was divided into forty-one smaller segments — the boundaries being delineated on the basis of roads, ridges, valleys and other topographical features and landmarks readily discernible from the air.

Coincident with these activities, collections of the branches of trees from various parts of the infestation were made early in the spring. These, placed in properly designed receptacles, enabled biologists in the Forest Insect Laboratory to establish the date when the minute larvae emerged from winter hibernation in bark crevices and similar protected places on the twigs. Later collections of larvae enabled biologists to check their development and chart the progress of their growth.

From such studies, carried out over a period of several months, it became evident that May 25 was the first date at which spraying operations could most logically begin, and that June 6 marked the last day at which operations could be undertaken with a reasonable promise of success. Also, since it is obvious that the life history of the budworm did not progress uniformly throughout the entire area, these studies also enabled biologists to evaluate the development of the larvae on each of the various working units and assign each a priority rating for spraying.

From the administrative point of view, preliminary negotiations had been entered into with the Pennsylvania Salt Company and the Ace Flying Service for the provision of the insecticide and the actual job of flying the area. Tentative decisions had also been reached as to the location of the air strip and the camp, and all necessary preliminaries were complete. This was fortunate, since Congressional approval of the project was given on June 3—only three days before the "zero hour" set by Bureau of Entomology biologists.

With the decks now cleared for action, the men charged with the responsibility of transforming this job from a plan on paper to action in the field swung into high gear. It was literally a race with the bud-

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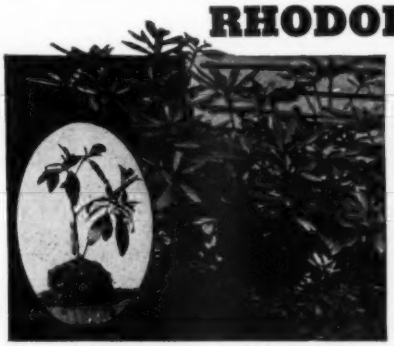

Photo: Rhododendrons, planted 3 years. Insert: Kalmia, on arrival.

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worm to determine whether the DDT could be applied to halt the ravages of this destructive pest before its development had advanced to the pupal, or resting, stage when it would be immune to the effects of the insecticide. Technical and administrative personnel were selected and dispatched to the scene of action.

All miscellaneous equipment necessary for the storage and pumping of gas and insecticide, as well as the maintenance of planes and related equipment, was quickly gathered at the air strip and made ready for action. A system of transmitting and receiving weather reports by radio was worked out. Planes of the Ace Flying Service arrived while all this was going on, landing in the wheat on the improvised air strip. Maps, previously prepared, were distributed to members of the force or set up at the base of operations on the air strip, and the various pilots were quickly given their first general briefing of the area and the objectives of the project.

Within three days the project was a going concern. During the entire operation every member of the crew worked at high gear and with a maximum of cooperation and a high state of esprit de corps. Fifteen days later the project was brought to a conclusion. It had been virtually completed in spite of the limited time available; only a relatively small area at the extreme southern end of the infested area remained untouched by DDT. There the budworm had already advanced to the resting stage.

The planes used were all converted military aircraft—N2S-5 biplanes and BT-19 Vultee monoplanes. A B-18 Douglas bomber was also used to advantage over areas of low relief. The pilots, all former service fliers of considerable experience, should be credited with much of the operation's success. These men showed an amazing dexterity in handling their craft in a manner that insured complete and proper coverage of the areas with insecticide. As was necessary, they flew less than 100 feet above the tree tops—so close in fact that one logging crew working on a hillside facetiously reported that they had "almost dropped a tree on a pilot as he was flying overhead."

The air strip, which took on more definite form as the wheat was flattened by planes, was reminiscent of scenes in the Hollywood versions of World War I. While a regular landing pattern was quickly worked out to insure maximum safety, the strip was a vortex of activity. Planes were swooping in, landing in a cloud of dust, roaring up to fuel and insecticide tanks for "re-fills," and as quickly bounding down the rough, improvised air strip again to get airborne. As one man remarked to a visiting news photographer, "Keep your eyes peeled and your head up. A man asleep here is a dead man!"

Since the insecticide could not be properly applied when air currents reached a velocity of more than six miles per hour, action on the air strip started at dawn, when the air was most quiet, and continued until radio reports from the local weather observers indicated that wind velocity had exceeded that figure. This usually took place between eight and ten in the morning.

The insecticide, a mixture of one pound of DDT to one gallon of fuel oil, was applied to the area at the rate of one gallon an acre. This concentration was effective against the budworm larvae, but, as indicated by experiments elsewhere, had no effect on birds, mammals and similar wildlife on the area.

Those in charge did not rely solely upon the skill and ability of the pilots in insuring an even distribution of spray. To guard against "skips" the spray pattern of the various planes was checked periodically from the air by observers in a Cessna 140 which was available for that purpose. The distribution was then double checked by ground crews. This was accomplished by running lines at right angles to the proposed lines of flight, previous to spraying on each of the various working units of the infestation. At regular intervals along these lines, about 100 yards apart, 4x4-inch glass plates were placed. Following the distribution of the spray, these plates were checked for acceptable spray deposits.

The results of the job were evaluated in a somewhat similar manner. Previous to spraying on each unit of the infestation lines were run. Along these lines trees were selected at random and marked for sampling the insect population. Four branches, each sixteen inches long, were selected from various parts of the crown and clipped off, the larvae then being shaken to a large canvas cloth so that their number could be counted and recorded. From seven to ten days after spraying, biologists returned to the same trees and repeated the process. The difference in the number of larvae gave an index of the degree of mortality and, con-

sequently, an indication of the effectiveness of the job. On seven of the units 100% mortality was recorded; the lowest mortality rating was eighty-eight percent; and the overall average for the entire area was ninety-seven and one-half percent—truly a remarkable figure.

The adult spruce budworm is an inoffensive appearing creature—a small mottled gray-brown moth with a wing spread of about three quarters of an inch. Like all moths and butterflies, it passes through four distinct stages in its life history—egg, larvae or caterpillar, pupae or resting stage, and finally the adult. One year is required for the completion of this life cycle. The moths appear late in July, mate and lay rows of ten to forty light green, overlapping eggs in the form of elongated clusters on the underside of the needles. These hatch in about ten days and the minute larvae emerge and crawl to bark crevices or similar places of protection on the twigs. Here, after weaving a protective web, they spend the winter in hibernation.

In the early spring, at about the time the buds begin to develop, these minute larvae again emerge. First mining into the closed buds, they grow rapidly by a series of moults and eventually devour all of the new foliage on the terminals of the twigs. Literally thousands of these larvae may infest a tree of average size during periods of heavy attack. The insect goes into the resting stage, preparatory to its transformation into the adult moth, in late June after a protective silken web is cast over the terminal portion of the twig. About ten days later the moths emerge and a new generation is started.

Trees in heavily infested areas have a reddish-brown cast, somewhat similar to that of a forest that has been swept by fire. Close inspection of the trees will indicate that the foliage on the branch terminals has been killed and devoured—appearing naked as though singed by a blowtorch. Although new foliage is preferred by the larvae, even needles of previous years will be destroyed in periods of heavy infestation. Likewise, although the Douglasfir and various species of true fir are preferred hosts in the Pacific Northwest, budworms were noted in heavy infested areas on western larch, ponderosa and lodgepole pine, and Engelmann spruce.

While Douglasfir and true fir will withstand one or two years of heavy defoliation without being killed, three or four years of consecutive attack will cause the death of a tree. Large areas of timber in the Blue Mountains of eastern Oregon, where the budworm has been established in numbers for several years, have already succumbed to the ravages of this insect. Perhaps Operation Budworm has pointed the way toward halting this devastation.

Amazon Survey Proposed

A proposal to make a survey of forests in the Amazon River Basin and adjacent areas of the Orinoco Basin is being submitted to the Food and Agriculture Organization of United Nations and the Pan American Union by H. M. Curran, American tropical forester now with the Venezuelan government.

South America, he said, is rapidly destroying its forest resources. "From the Gran Chaco region of Argentina to the delta of the Orinoco, fires and shifting agriculture are annually destroying hundreds of thousands of acres of commercial timber."

It is known, he said, that vast areas of Colombia, Ecuador, Peru, Bolivia, Brazil and Argentina have been denuded of forests by the advance of agricultural interests on land which would yield greater economical returns if retained under forest cover.

United Nations direction of a survey appears logical in view of the number of South American countries involved. A group of economists, geographers and foresters representing the different countries could be selected and a central office provided for assembly and tabulation of land classification.

A preliminary survey from the air is recommended, after which a more detailed ground survey would follow to determine commercial possibilities of specific timber regions.

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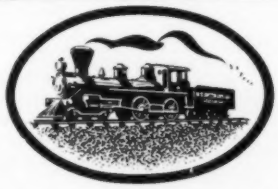

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AFA's 75th anniversary meeting at Eagle River, Wisconsin, in October is the headline for this month with the good news that our friends from the Canadian Forestry Association will be meeting with us. CFA, in this great historical year of conservation, is celebrating its 50th anniversary, so the occasion for this joint international meeting takes on added significance and prestige.

Our hard-working people in Wisconsin are leaving no stone unturned to make this a truly momentous occasion. We think it is an opportunity AFA members can't afford to miss, and we urge you to send in your reservations to the Housing Committee, Eagle River, Wisconsin, as soon as possible.

Conservation Awards, sponsored by the AFA, will be given this year to five prominent Americans for their outstanding work in various fields of forestry. Those to be honored include: Charles F. Evans, president of the Society of American Foresters, Atlanta, Georgia; J. N. "Ding" Darling, noted cartoonist of Des Moines, Iowa; Wakelin McNeel, Madison, Wisconsin, better known as "Ranger Mac"; Colonel William B. Greeley, Vice President of the West Coast Lumbermen's Association, Seattle, Washington; and Harry E. Wood, state supervisor of agriculture education in Florida, Tallahassee.

These men were recommended by AFA's Conservation Awards Committee of Robert N. Hoskins, chairman, Congressman Watkins M. Abbitt, Milton M. Bryan, Dr. M. D. Mobley, Fred Morrell and E. A. Norton, and have been approved by the Board of Directors of the Association. The awards will be presented by President Spurr at the annual meeting. We take this occasion to congratulate the winners and to thank our committee for a job well done. There will be more about these important people in the November issue.

Plant More Trees. Members and their friends, particularly in the educational fields, will be interested to know that the AFA ordered a reprinting of PLANT TREES, popular four-page bulletin with illustrations on how to start a young forest and a chart on how a tree grows. This bulletin, distributed free in limited quantities, has had wide acclaim among teachers and students of elementary and secondary schools. Send for your free copy today. Your Association will gladly quote prices for orders of fifty or more copies.

Across the Border. AFA continues to maintain its interest in what other countries are doing to protect and conserve their natural resources. Acting upon a request recently received from Juan F. Diez of Cosolapa, Mexico, the AFA Service Department sent him a complimentary selection of magazines and reprints from the file of *American Forests*. The kit of materials will be exhibited at the Congress for the Conservation of the Soil and Water to be held during the month of October 1950 at Cordoba, Mexico.

W. Goodrich Jones, AFA member of long standing and widely known early day crusader for forestry in Texas, died at his home in Waco on August 2. He was 89. It was through the enthusiasm and unselfish efforts of Mr. Jones that the

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Bryce C. Browning, 1950—Ohio, Muskingum Watershed Conservancy District.

W. J. Damtoft, 1952—North Carolina, Southern Pulpwood Conservation Association.

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C. H. Flory, 1950—South Carolina, Association of State Foresters.

Karl T. Frederick, 1952—New York, New York State Conservation Council.

William B. Greeley, 1951—Washington, West Coast Lumbermen's Association.

Don P. Johnston, 1952—North Carolina, North Carolina Forestry Association.

Kent Leavitt, 1951—New York, National Association of Soil Conservation Districts.

George W. Merck, 1950 — New Jersey, Merck & Co., Inc.

Walter H. Meyer, 1951 — Connecticut, Yale School of Forestry.

Randolph G. Pack, 1952 — New York, Charles Lathrop Pack Forestry Foundation.

Lloyd E. Partain, 1951 — Pennsylvania, The Curtis Publishing Company.

Theodore S. Repplier, 1951—District of Columbia, The Advertising Council, Inc.

James J. Storrow, 1952 — New Hampshire, Society for the Protection of New Hampshire Forests.

William P. Wharton, 1950—Massachusetts, National Parks Association.

Texas Forestry Association was formed in 1905. He served as its first president and in later years as president emeritus. Through his leadership, the Association in 1915 succeeded in inducing the Texas legislature to create the Texas Forest Service.

In honor of a half century of service to forestry and forest conservation, the State of Texas formally dedicated a state forest of 1700 acres in the name of W. Goodrich Jones on May 19, 1949. Actually his forestry efforts are traceable to the early 1880's when he launched a tree planting movement in the prairie town of Temple, Texas. For years after his friends referred to him as "Hackberry" Jones, but today hundreds of hackberry trees shade Temple's streets because of his foresight.

In 1889 a group of Temple citizens met on a street corner, and at Mr. Jones' suggestion passed a resolution advocating the establishment of a state Arbor Day on February 22. Later that date became the state's official Arbor Day.

John W. Blodgett, Patron Member of the AFA from Grand Rapids and Harbor Springs, Michigan, celebrated his ninetieth birthday on July 26. Mr. Blodgett is known throughout the country for his long association with the lumber industry which he helped to guide as former president of the National Lumber Manufacturers Association. He writes: "Looking back, I do not feel that I have done so much for the lumber industry. Whatever of importance was accomplished was the result of many minds. I was only one of the crowd."

Toward Wiser Use of Wood, a publication of the forty-year history of the Forest Products Laboratory at Madison, Wisconsin, is extremely interesting and unique. It was published and paid for by the employees of the Laboratory and not with government funds. This certainly typifies an esprit de corps and we congratulate these people on a job well done.

J. L. Van Camp is the new general manager of the Canadian Forestry Association, who returns to Canada after eighteen years of forestry work in the United States. We extend to "J. L." the best wishes of the AFA in his exciting new field of activity. Good wishes also go to Norton Anderson, "J. L.'s" predecessor, with whom we had a number of enjoyable meetings.

Henry McKnight, AFA member of Fairfax County, Virginia, is coming along nicely with his farming and forestry operations at Cornwell Farm. We have visited Henry a number of times and walked over his green, lush pastures and through his verdant woods. Henry is concentrating on trees and grass at Cornwell. On our last trip it was our pleasant experience to help Henry and a number of his friends dedicate his new barn, largely constructed of timber cut from his nearby woods. Henry will have a story on this in a future issue of the magazine. It is always fun to visit with the McKnights and their children. The cares of the day always seem to melt away when we sit with them on their wide, sweeping lawn, enjoying their hospitality and beautiful view of rolling fields and green woods.

Bouquets: Oscar McKinley Byrens of Three Rivers, Michigan, writes: "With the exception of a few months, I think I have been a member of The American Forestry Association for nearly twenty-three years. Very likely our membership is getting down to where there are not many in our present list who have been in longer than I now have. By this the thought can come to you of how great my interest is in trees and forestry by being a member of this organization for this period of years and keeping *American Forests* coming."

New Life Members whom we welcome to AFA include: Mrs. Roland T. De Hellenbranth of New Jersey, Allen E. Foster of New York City, J. M. Hamer Lumber Company, Incorporated, of West Virginia, the Lindsay Wire Weaving Company of Ohio, George W. Peake of Georgia, H. S. Peck of Wisconsin, Peter Wyckoff of Indiana, Charles C. Haines of San Diego, California, and Dr. John D. Houghton of Newton Center, Massachusetts.

S.L.F.

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Editorial

THE AFA STATES ITS WATER POLICY

The position of The American Forestry Association in respect to federal responsibility in the development, utilization and conservation of water resources, was recently set forth by its president, A. C. Spurr, in a letter to Morris L. Cooke, chairman of the President's Water Resources Policy Commission. Earlier, Mr. Cooke had asked the Association, along with other national conservation groups, for suggestions and recommendations that would help the Commission get to the core of this increasingly complex problem.

Briefly, the Association's recommendations call first for a "thorough and accurate" appraisal of the conditions of "our soil, forests and water resources," findings to be summarized by states, counties and watersheds to "serve as a foundation guide to conservation and utilization of all renewable natural resources."

The first and most important "area of activity" in a comprehensive water program would be to reduce excessive runoff of rainfall "on every parcel of land area contributing to a stream source." Not only would this save more rainfall for use where it falls, or to recharge underground supplies, but it would reduce damage to the land and thereby excessive siltation in streams, lakes and reservoirs.

"Therefore," said Mr. Spurr, "treatment of agricultural lands and forest areas becomes the primary problem of control of erosion, runoff and waterflow retardation, the greatest preventatives of damaging floods downstream. Proper land use, soil and water conservation, farm and forest management, based upon the proper appraisal as a guide of land, forest and water conditions, seem to be the proper solution to the major water problems of this nation. Such treatments to be effective must begin on small watershed areas."

Each phase of any multi-purpose soil, water and land use and conservation program, he said, should "bear its proportionate share of the development, construction and maintenance costs." Any subsidization of these activities should be limited to "strict definition of public interest, safety and welfare of all the people." In other words, general farming should not subsidize national forests or vice versa; likewise, power production should not subsidize irrigation.

In any program involving public expenditures, local, state and federal interests should share equally in the costs—as well as benefits which might accrue from developing and maintaining both minor and major water projects.

"In keeping with the desires of the American people for individual rights, liberties and private initiative," Mr. Spurr said, "individual and corporate interests should be encouraged to develop water projects consistent with the public welfare. Wherever it is impracticable for private and corporate interests to develop such projects fully, public participation should be in cooperation with and not exclusive of these interests.

"The best known vehicles existing today permitting private, corporate, local, state and federal participation in any integrated program of conservation are to be found in a variety of state enabling acts. These acts permit creation of a subdivision of state government formally constituted into local bodies, corporate and politic, known as drainage districts, soil conservation districts, conservancy districts and interstate commissions on large watersheds. In addition, certain voluntary associations are in a position to contribute wide support to these activities."

Individual and corporate users of large areas of forest and agricultural lands should be encouraged to supply technical assistance needed in its conservation, development and use. Local, state and federal governments should likewise be encouraged to supply technical assistance, particularly to landowners not in a position to obtain it otherwise. Governmental assistance of this type should be limited to "technical services with the responsibility of installation and material costs" left to the landowners.

"Federal and state governments especially should be encouraged to conduct research in the field of soil, forests and water conservation and use. Emphasis should be placed on research, limited, where possible, to needs for practical application as determined by the resource appraisal. Moreover, corporate, industry-wide and foundation sponsored research in this broad field should be encouraged —with duplication of effort avoided by federal and state governments.

"Existing authority under various federal acts, including the Omnibus Flood Control Act of 1936, should function through legally constituted local subdivisions of government," he declared.

A thorough and accurate appraisal or inventory of renewable natural resources adequately determining soil, forest and water conservation and utilization needs, should serve as the only basis for expenditures of public funds—local, state, or federal—for conservation of renewable natural resources. "Once an inventory or appraisal of this kind is made and kept up-to-date, any public conservation activity not based on such information should be rejected as a public policy."

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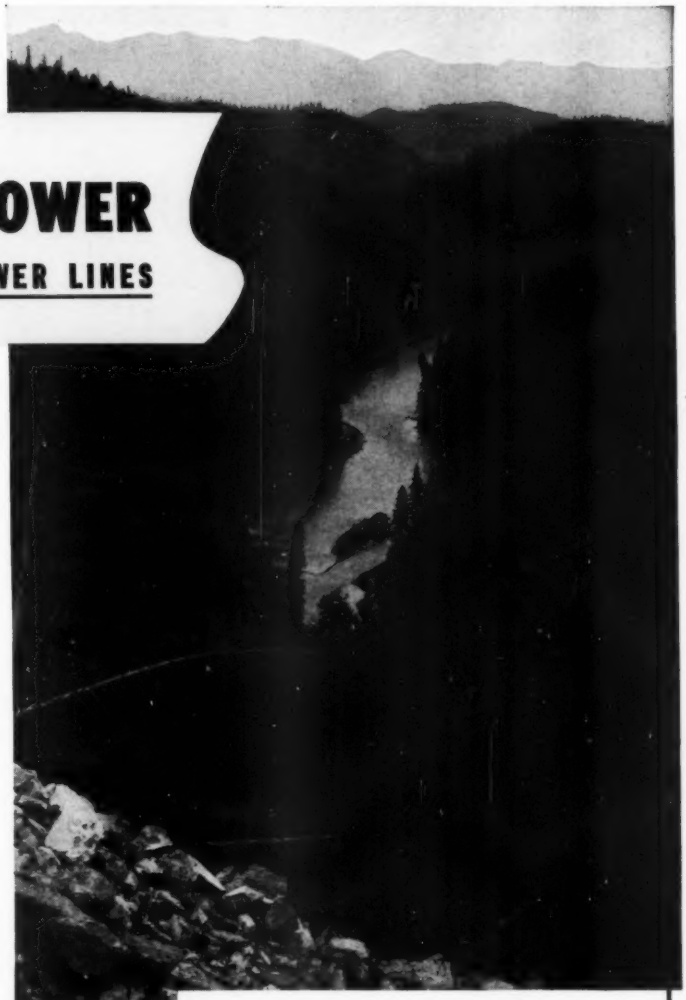

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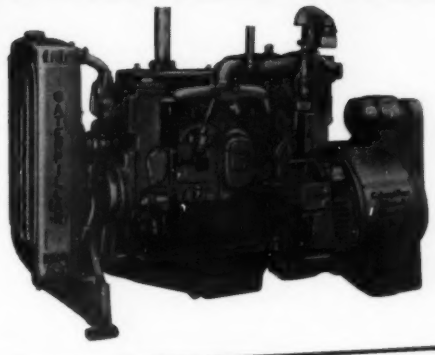

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